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MAPPING LANDSCAPE FEATURES & VALUES IN COASTAL AUSTRALIA

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ABSTRACT

Places encompass the physical setting, as well as human experience and interpretation. Although sense of place definition nominally includes the physical environment, most research has emphasized the social construction of sense of place and neglect the important contribution of the physical environment to place meanings and attachment. On the other side, theoretical and technological developments during the past decades resulted in significant sophistication and power of analysis, display, and interpretation of spatial information applied in landscape analysis. This development, however, remains disconnected from the socio-political realities of the communities and regions which are the subject of these studies. There is a research need to integrate public perceptions and attitudes with the type of information typically found in a landscape assessment. A challenge of GIS is whether or not Cartesian space can be adapted to incorporate a more humanistic sense and understanding of distance, direction, and position.

Using the Greater Geelong Region and the data from peoplemap project, we address in this paper the following question: Can we map landscape features and landscape values in an integrated manner into a GIS to achieve a better understanding of resident’s perceptions on their geographies? This paper presents the preliminary findings of the research on mapping into a GIS platform different landscape values/perceptions associated to the same landscape feature “the ocean”. Although being very specific and still limited in terms of its application to planning purposes, the exercise developed here demonstrated the potential of GIS to represent not only cartographic space, but also the sense of place of a region.

KEY WORDS: GIS, Space, Place, peoplemap

INTRODUCTION: THE ROLE OF GIS CONNECTING SPACE AND PLACE

Community has been conceptualized in the literature as a place, as relationships, and as collective political power (Chavis and Wandersman, 1990). These aspects of community cannot be fully separated; places encompass the physical setting, as well as human experience and interpretation. In this context, place attachment is a positive emotional bond that develops between people and their environment (Shumaker and Taylor, 1983). Sense of place is therefore conceived of as encompassing meanings, attachment and satisfaction.
Understanding the role of physical environment in contributing to each of these domains is essential for planning purposes, which normally affect and change landscapes (Steadman, 2003). According to Ryan (2011), planners need to know as much about the social landscape as they do the physical landscape before embarking on planning actions.

Although sense of place definition nominally includes the physical environment, most research has emphasized the social construction of sense of place and neglect the important contribution of the physical environment to place meanings and attachment. As emphasized by Steadman (2003), however, if the physical environment matters little as source of attachment, therefore serious environmental degradation may occur, while leaving attachment intact. Nonetheless, the physical landscape may change to a degree that preferred meanings become untenable. This is an important issue to be addressed by planning, especially in areas where sensitive natural or cultural elements are the objects of identity, attachment, satisfaction and engagement.

Rather than being seen only as a physical backdrop, container, or stage to human life, space is more insightfully viewed as a complex social formation, part of a dynamic process (Ayres, 2010).

There is a research need to integrate public perceptions and attitudes with the type of information typically found in a landscape assessment. Theoretical and technological developments during the past decades resulted in significant sophistication and power of analysis, display, and interpretation of spatial information applied in landscape analysis. Most of the work on Geographical Information Systems (GIS) has focused on the physical landscape through models able to describe, assess, and predict the implications of future planning issues. This development in landscape modeling, however, remains disconnected from the socio-political realities of the communities and regions which are the subject of these studies (Ryan, 2011).

GIS is a powerful technology that uses location to integrate and visualize information. Within GIS, users can discover relationships that make a complex world more understandable by visually detecting spatial patterns that remain hidden in texts and tables. Pattern recognition is the primary form of human perception and in this sense, mapping is not only cartographic, but conceptual.

Ayres (2010) suggests that geography, unlike other sciences, is not the study of any particular kind of thing, but a particular way of studying almost anything. Geography is a point of view, a way of looking at things. What is important about assigning a geographic reference to data is that it then becomes possible to compare that characteristic, event, or phenomenon with others that exist or have existed in the same geographic space (Kemp, 2010). What were previously seemingly unrelated facts become integrated and correlated.
Geography is a fertile ground for crossing the traditional boundaries of science, social theory, technology, and the humanities. Geography is the discipline most concerned with studying the relationships between the human and physical phenomena (Ayres, 2010). New thinking in geographic theory, combined with new technology and techniques, suggests that we may be able to represent the intersection of space and place (Steinberg and Steinberg, 2006).

Humanists defend that evidences about the world depend upon the perspective of the observer (Bodenhamer, 2010). Two people who view the same object may interpret it quite differently because of their different assumptions and experiences. This is a distinction that GIS obscures. Defenders of conventional GIS respond that this difference does not matter because, regardless the name, the object remains the same. It assumes that objects exist independently of the observer.

While GIS heavily rely on quantitative accurate coordinate systems to represent space, people work on qualitative relationships based on topological relationships to interpret space. The importance of these “maps” in understanding places is based on the notion of local distinctiveness and of what is important to people who live there and encounter aspects in their daily lives that are important to them. A challenge of GIS is whether or not Cartesian space can be adapted to incorporate a more humanistic sense and understanding of distance, direction, and position (Lock, 2010).

Recognising the spatial nature of social identity and relations, Jorgensen (2010) argues that individuals may share significant spatial objects identified with their subjective neighbourhoods, such as a park, a shopping centre, a beach, etc. Founded in attitude theory, those spatial objects are defined by Jorgensen as spatial attitude objects, since their meaning for individuals or groups imply attitudes towards the object. In this context, meaning and satisfaction concerned to an object/place can be related to engagement and participation in processes affecting the object/place. In attitude theory, strong attitudes affect information processing, are resistant to change, persist over time, and help to predict behavior.

According to Jorgensen (2010), having defined a spatial object in this way, evaluative mapping involves attaining a description of the object in a manner that engages the affective, cognitive and behavioural components of the individuals’ attitude towards that spatial object. Perception of the community environment involves judgment about the environment, such as perceived qualities of the environment, satisfaction with the environment, identification of problems, etc (Chavis and Wandersman, 1990). Positive perceptions can be related to pride and engagement of individuals towards their communities. Negative perceptions can cause stress, but they can also serve as a motivator to engagement and action in the community.

Articulating such an approach with a GIS representation, means that a unique spatial object, landscape feature, may have different meanings for different individuals or groups, landscape values (Brown and Raymond, 2007). These different meanings should potentially result in breaking a single landscape feature into more than one feature.
According to Yuan (2010), mapping text is a field of research which attempts to explore the possibilities of projecting text to produce maps and enabling maps to tell stories. This is a new concept in GIS. Text has not been an important source for GIS data. In order to use text as a GIS data source, new models and tools are needed to extract values from narratives or stories and to populate a database.

The process of spatialization is one possible method for mapping text. The use of spatialization for text-map transformation assumes that spatial locations and extents are available for entities identified from the text. Spatialization is an effective means to visualize text and invite exploration, analysis, and interpretation when reading text alone cannot lead to a complete grasp of connections and correlations among documents (Yuan, 2010). Once place in text can be georeferenced and connected geographically, it is possible to examine these places in semantic space based on their attributes and in geographical space based on their locations. Such comparison can suggest potential factors and drivers that make a location a place.

**CONTEXT: GROWTH OF REGIONAL AUSTRALIA AND PLACE ATTACHMENT**

Australia is a highly urbanized nation, with 60% of its population concentrated in five State capital cities, along the coast. Over the past 30 years, and more intensely in the last decade, there has been a distinct movement from inland centers and capital cities to attractive non-metropolitan coastal areas, mainly for lifestyle reasons (ABS, 2006). Gurran et al. (2007) coined that process as amenity migration.

Geelong, and its surrounding coastal and rural regions, the Bellarine Peninsula and the Surf Coast, were study areas involved in Gurran’s research. Indeed, Geelong is the second largest city in Victoria, which went through significant transformation, from a former port and industrial city to a lifestyle and knowledge based economy. Currently, Geelong region is one of the areas identified by the Federal and State governments to accommodate intensive population growth forecast for the next decades. Its existing infrastructure and proximity to the State capital, Melbourne, are important drivers in this process. In a cascade effect, the growth of Geelong may potentially cause growth and changes in the surrounding coastal towns, which are highly polarized by Geelong in terms of access to jobs and large facilities (Leao and Elkadi, 2011).

Rapid population increases, in general, affect the physical character of a community, as the core settlement expands, as sites are re-developed and new services and facilities are introduced. In the specific context of coastal growth, development occurs in extremely fragile environmental and cultural landscapes. In response to these changes, many coastal communities in a study involving 55 coastal cities and towns in Australia (Gurran et al, 2007), reported a loss of sense of place. Residents of high growth coastal areas also reported the experience of loss of sense of community or connection to social networks, because of the influx of new residents or visitors.
In practice, often the focus in community development and planning is on economic and political factors, with little or no regard to particular preferences, perceptions, and emotional connections to place. Academic research deals with both aspects, but mostly in separate. Literature on place attachment has been focused on individual feelings and experiences and has not placed these bonds in the larger, socio-political context in which planners operate. On the other hand, the community planning literature emphasizes participation and empowerment, but overlooks emotional connections to place.

Proposed development projects can be perceived by some community members as a threat to place attachments because they will change the physical fabric of the neighbourhood. Those who feel their relationships to their community places are threatened by redevelopment may consequently resist a proposal regardless of its potential value.

Investigating NIMBY (Not In My Back Yard) response to locally unwanted land uses, such as waste landfills, prisons, or wind turbine farms, Devine-Wright (2003) argues that policy makers typically depict people as inflexible and irrationally opposed to change, while assuming self-interested and egoistic motives for behaviour.

To adequately understand and respond to such reactions, from both community and policy makers, it is critical to uncover and address these latent place attachments, and review the criteria and the processes for planning and decision making in urban and regional contexts.

The United Nations Centre for Human Settlements emphasizes that good urban governance is characterized by sustainability, decentralization, equity, efficiency, transparency and accountability, civic engagement and citizenship (UNCHS, 2000).

According to Gurran et al. (2007), many local authorities in the sea change contexts in Australia, have been unprepared for the sudden increases for demand for new housing and tourist developments in their localities and have inadequate controls in place. As impacts on biodiversity, habitat and landscape values are most significant during the early stages of development, it is important to support smaller local authorities in setting up planning controls and assessment procedures.

**OBJECTIVE: CAN GIS HELP TO UNDERSTAND PEOPLE’S PERCEPTION OF PLACE?**

Geelong is one the main regions in Australia for accommodating population growth in the next decades. G21 forecasts more than 110,000 new inhabitants in the region by 2031, a change of almost 40% above current population level. In this context, an essential question that has to be made is “Is it possible to plan and manage the growth of Geelong region without losing community character and environmental values?”.
Peoplemap is an initiative sponsored by Deakin University, Geelong Performing Arts Centre and Barwon Water. As a first step in addressing the question posited above, peoplemap project is focused specifically on understanding people’s perceptions and preferences toward Geelong Region, providing individuals with opportunity to broadcast their voice and possibly influence their future. The focus of the research is on the following questions: (1) What are the preferences of people in the region? What do they like and what do they need? (2) How much engagement do people have in the region? (3) How much willingness do people have to contribute to the region?

In this paper we address an additional question to peoplemap research: Can we map landscape features and landscape values in an integrated manner into a GIS to achieve a better understanding of resident’s perceptions on their geographies?

METHODOLOGY: MAPPING LANDSCAPE FEATURES & VALUES IN GIS

Peoplemap methodology involved the following steps: (1) based on the “Vox Populi” technique (Schlozman, 2003), interviews were audio/video recorded with answers for the three questions described in the objective session of this paper; (2) interviews were transcribed and de-identified; (3) transcripts were explored through thematic analysis method, which provides a platform for qualitative interpretation of the concepts and for structuring a coding frame (Fereday and Muir-Cochrane, 2006); (4) tabular statistical analysis were developed, quantifying surveys of the results of thematic analysis, which involves indicating frequencies in individual codes and themes. This stage has been described in the report entitled “The voice of the people: The peoplemap pilot.” (Asher et al., 2011). Three areas were compared, Ocean Grove, Bannockburn, and Corio, as representing a coastal, a rural, and an industrial area, respectively. In this approach, the coding frame was grouped by locality in a tabular manner and analysed by simple statistical frequencies. Important to notice that this way of grouping answers heavily rely on administrative defined boundaries, which not necessarily relates to people perceptions of space. The result is that each locality has been related to one main code for each interview question. For example, the coastal town identified the ocean or the beach as its best characteristic. The industrial area, on the other hand, found the proximity to everything (high accessibility) as its best asset.

The GIS approach proposed in the present paper changes this setting. The coding frame is mapped, geographically tagged to the locations where the respondents live. The subsequent grouping of answers, therefore, is not based on the name of the suburb, which is mainly an administrative defined boundary. The grouping results from geographical clustering analysis, based on spatial similarities/differences, relative proximity/distance, etc. In this case, spatial boundaries are derived from the analysis of the answers and their locations, which is the opposite of the previous approach adopted in peoplemap (tabular statistical analysis).

To test such an approach, we focused on the first and second questions of the interviews: (1) where do you live, which provides the georeference of the respondent; and (2) What do you like most about the place you live, which provides description of landscape features and values. 61 out of 165 interviews of peoplemap, are related to respondents that stated landscape elements, such as ocean, rivers, parks, scenery and open space as the best assets in their place of residence. 32 out of 61 were specifically related to the ocean. In this paper we are focused on different perceptions of the ocean by residents of the region.

RESULTS AND CONCLUSIONS
Conversion from unstructured text to structured tables and maps in GIS is a non-trivial task. In this paper we assessed the use of GIS to map landscape values related to landscape features and their different locations. In conventional GIS, the coastline is usually represented by a homogeneous border line; and distance from the coast is conventionally obtained by a function which creates a homogeneous buffer around and along the coastline. However, results from mapping peoplemap study showed that the relation of communities towards the ocean, and the feelings of proximity to the ocean significantly change along the coast in the Greater Geelong Region.

(a) Greater Geelong: Geographical clusters and buffer related to the ocean
The ocean has been characterized as “the beach” or as “the bay” by respondents of the peoplemap research, and these two classes are clearly separated/clustered geographically (Figure 1.a). Important to note that the two classes imply different uses of the ocean. The first perception of the ocean – the beach – is related to the ocean in the small towns of the regions, with bathing, water sports, natural reserves, unpaved tracks, etc (Figure 1.b). The second perception of the ocean – the bay – is related to the waterfront in the centre of Geelong, with a more urbanized use of the coast, such as paved paths, restaurants, urban parks, etc (Figure 1.c). Most of the respondents who indicated proximity to the ocean as one of the main positive aspects of their place of residence live within a distance of 2,500 meters from the coastline. However, there are some important exceptions to this rule. First, some suburbs located inland, significantly away from the coast, still identified proximity to the ocean as an important aspect of their place of residence, such as Belmont and Leopold. This can be a consequence of the perception of “far” or “close” in a country of immense dimensions, and also an affluent population who heavily rely on the use of private transportation. Also, this can be the result of the iconic image of the coast for the Australians. Armstrong Creek, for example, is a new development extending from the current urban border on the south part of Geelong. It is an inland development, around 15 to 20 km from the ocean. Advertisements for real estate sales in the new development use images of “beach life style”. Second exception to the homogeneous buffer from the coastline, is the fact that residents from Corio suburb have not identified the ocean as an important and positive aspect in their neighbourhood, although most of them are within the buffer zone “close” to the coast. A look at other geographical features in the suburb shows that there is a barrier separating the community from the ocean, composed by a main highway and an industrial zone (Figure 1.d).

The present paper presents the preliminary findings of the research on mapping into a GIS platform different landscape values associated to the same landscape feature “the ocean”. Although being very specific and still limited in terms of its application to planning purposes, the exercise developed here demonstrated the potential of GIS to represent not only cartographic space, but also the sense of place of a region. The simple, homogeneous and geographically accurate line representing the coastline of the Greater Geelong region assumed a complex embodiment when different meanings and different spatial relations were attached to it, representing not only a geographical delineation but also people’s perception. Such understanding of people’s sense of place and attachment should be used in future
plans and projects in the region, including community participation and stimulating community development.

Policy priorities for coastal management including environmentally and culturally sensitive areas should develop appropriate urban design controls to protect and promote aspects of place important to local residents and other stakeholders, and also implement specific mechanisms to engage local stakeholders in coastal decisions. Understanding and trust among community, government and other organizations can be built from this. Further step in this research will address the mapping of different landscape features and their associated landscape values, completing the approach of question 2 of peoplemap project. Moreover, it will work on mapping responses from questions 3 and 4, which are related to problems in the region identified by residents (negative perceptions) and willingness of residents to engage in solving problems or improving current situation. From the complete research, place attachment and place engagement can be investigated from a spatial perspective, potentially uncovering important patterns to assist the planning in the region.

REFERENCES


