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Tracey is currently working in the Treaty Sector in the Central North Island with Maori, Waitangi Tribunal, Office Of Treaty Settlements and negotiating groups. She is presenting a paper with Lars Brabyn.

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Difficulties of Incorporating Māori Worldviews into GIS-based Classifications of Natural Landscape Character in Aotearoa, New Zealand

This paper discusses the difficulties associated with representing Māori perspectives within a GIS-based classification of natural landscape character. The landscapes of Aotearoa are constantly being changed through a range of land uses such as forestry, tourism, life style blocks, and urbanisation. These can be very contentious issues that are often in the environment court. Landscape values are often compromised for the private gain of individuals or companies. These landscape issues are complicated by the complex nature of landscape being a combination of physical features and human perception processes.

Often landscape management strategies attempt to classify the landscapes so that there is an inventory of the landscape resource and a frame of reference for communication. Classification can be assisted by the use of Geographical Information Systems because of the efficiency of the technology and its ability to copy with a wide range of data sets. Such an approach has involved an analysis of landcover, property sizes and utility density.

GIS approaches have difficulty incorporating Māori perspectives that include non physical landscape phenomena and take a more holistic approach in identifying specific aspects dominant in their world. These aspects are the conceptual understanding of Io Matua Kore (Io the Parentless One) and from Io the creation of Te Kore, Te Po, Te Wheiao, and Te Ao Marama.

In analysing the literature on how Māori perceive their space, many coastal areas have similar facets: they hold spiritual relevance and significance; they have a historical lineage; they are also spaces of food resources and other resources; they hold strategic positions within a whānau, hapu, and iwi context; and; they are fundamental to the social and economic survival of coastal Māori (Kingi 1999, Love *et al.* 1993, Phillips 1989, Takirirangi 1998, Tutua-Nathan 1995, Solomon 2001, Stokes 1978, 1980a, 1980b, and 1980c).

Phillips (1989) descriptions in *Nga Tohu a Tainui*, of historical events name significant coastal places that give a definitive character for that specific geographical space. Landmarks that are used as boundaries tell of events that shape not only the physical geography of a particular space but also, geographies that shape the spaces in which people interact. These spaces Bevan (1998), indicates maybe problematic for users of GIS, where Māori boundaries sit outside the constructs of western mapping techniques, that are delimited by demarcation lines that define areas of use. Ryks (2000: 2), highlights such use of western constructs arguing that liminal spaces created by people also contest western approaches, and to 'imagine an environment where invisible lines divide fluid from solid, and signify what is owned in common and what is not'. This invisible dividing line poses problems for Māori, for

within Māori conceptual knowledge there are no lines that divide fluid from solid, or what is owned in common and what is not.

Bevan, in discussing issues relevant to Māori identified how the use of vector based MapInfo posed problems for Ika Whenua where they 'will be forced to place a discrete boundary line around their land to delimit their political sphere of influence' and, 'it is not the place of the technology to decide boundary conditions but rather the relevant people within the tribal decision making hierarchy' (1996: 12). A delimiting line is problematic in that they separate whānau, hapu and iwi from their origins and lands of occupancy, and relocate them inside other tribal boundaries and therefore, take away their right of mana whenua.

The question becomes: How do we reconcile GIS-based classifications with these Māori perspectives? The answer is not obvious and more research and thinking is required. It is clear that GIS classifications need to state their limitations with respect to Māori perspectives. A possible solution may be in the use of a range of GIS techniques, called fuzzy set theory, that are able to incorporate multiple perspectives and remove the boundaries associated with GIS classifications. Such an approach shows the "messy" nature of our world and provides information on uncertainty. GIS users need to apply a collaborative approach and apply different constructs to view and shape the world in which we live.

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