Developing Meaning into Visualisations of Sustainable Forestry in New Zealand

Summary

Visualisations are powerful communication tools in the dialogue on sustainable forestry issues in New Zealand. They provide a useful addition to the communication of forestry-related concepts, processes, visual impacts and data. Developing meaningful visualisations is not trivial and a number of steps have been developed toward designing them. They focus on:

- Understanding similarities and differences in meanings across the stakeholder groups through concept mapping
- Investigating approaches to and details of visual representations of issues

A structured design approach using concept mapping, expert key informants, and practical trials is proposed to facilitate the development of visualisations that reflect, as best as possible, the key issues for sustainable forestry in New Zealand. In doing so, they have the potential to assist the debate between forestry stakeholder groups.

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INTRODUCTION

Demonstrating the environmentally sustainable production of wood and wood fibre in New Zealand faces a number of challenges. Society is increasingly aware of environmental issues, global and local risk, and the protection of community rights. Individual and groups are prepared to challenge forest managers and decision-makers about the integrity and sustainability of their forestry practices (Hancock, 2003; Turner, 2003). This may, in turn, create risks around the sector's license to operate and to access international markets.

The forestry sector needs to be able to convince international and national communities that forestry practices in New Zealand are sustainable and that they reflect the values of stakeholder communities.

Effectively communicating about sustainability becomes an important tool to address differing perceptions and understandings, and the resulting tensions these create. Structuring the dialogue within a framework that combines environmental issues with values and views has the potential to facilitate the development of multiple ways of knowing (Graffy and Booth, 2008). Visual communication, well recognised for its ability to communicate powerful messages quickly (e.g. Sheppard, 2005), provides a vital facet of such communication.

This technical note introduces the next steps in the development of visualisations for sustainable forestry. It proposes a 'concept mapping' methodology to investigate the ways in which stakeholders understand sustainable forest practices, and a comparative evaluation of visualisation techniques designed to engage with these diverse understandings in ways that are meaningful to stakeholders.

Different Understandings

The FRST programme "Protecting and Enhancing the Environment through Forestry" (PEEF) has drawn on a number of workshops and surveys of stakeholders in New Zealand forestry to understand the important issues to sustainable forestry in the country (synthesised in Hock, 2010), namely:

- Water
- Soil
- Biodiversity
- Social

There are representational challenges to communicating across the diversity of issues and understandings revealed in the workshops.

Analysis of Meaning

While the prioritisation of the key issues for sustainable forestry was a synthesis of the diverse stakeholder views and values, the step described in this section focuses on the individual groups.

The workshops and surveys used for the prioritisation process provided a rich source of knowledge on the individual groups' meanings for the key issues; these are explored by the use of concept maps.

Concept maps provide a graphical approach to representing knowledge (Cañas et al 2005), with the concepts represented by boxes or circles, and the relationships or links between the concepts represented by directed lines. An extract from the mapping of forest users' social issues, which predominantly focused on forest access (Barnard et al, 2010), is shown in Figure 1 as an example concept map.

Concept maps provide a visual approach to organising, assessing and communicating knowledge about a topic or focus question (Plotnick, 1997, Novak & Cañas, 2006). Software tools for concept mapping such as Cmap (Cañas et al 2004) provide interactive environments where maps can easily be updated, shared, reviewed and published.
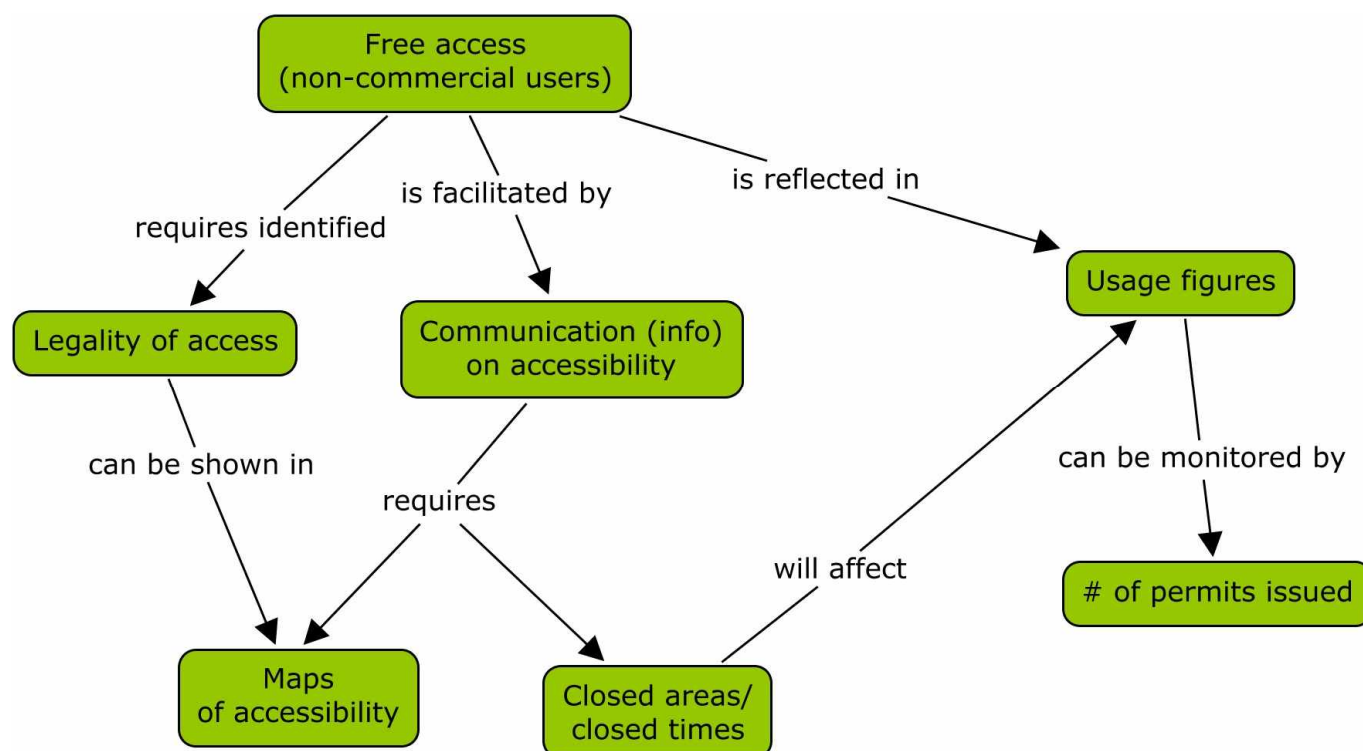

Figure 1. Concept map example from the forest user stakeholder group

The theoretical basis for the mapping is to consider concepts as constituting boundary objects between the stakeholder groups, where a boundary object "is able to maintain a certain integrity or core content while being flexible enough to be scientifically or politically meaningful for different actors" (Salmi and Toppinen, 2007). Each of the stakeholder groups understands these boundary objects within their individual context (Fonseca & Martin, 2005). Exploring what each group considers meaningful for each key issue, and what the similarities and differences in meanings are across the stakeholder groups, enables better understanding of the balance between core meanings and the more flexible interpretations.

Concept maps are being developed for each of the four key issues identified above. Each stakeholder groups' views and values on each issue will be mapped. These maps will make the differences and similarities across the groups more visible and explicit.

Representation

Reasonably realistic representations have the potential to demonstrate concepts and issues in a compelling manner. Landscape visualisations that represent actual places and on-the-ground conditions with which people can more readily identify have a particular high impact (Sheppard, 2005), and are being increasingly used in a range of applications around the world. In order to develop visualisations that are meaningful to sustainable forestry in New Zealand, we need to investigate visual representations of the relevant issues and concepts.

An email survey of professionals who have had some involvement in visualisations is currently underway (May-June 2010). The survey asks questions about the respondents' involvement in and experiences of visualisations of rural landscapes that include trees. This survey has been sent to Foresters, Landscape Architects, Council Officers, researchers in New Zealand universities, and GIS users.

Future steps will include more detailed investigations into representation (i.e. what to include in or exclude from visual views); realism versus more diagrammatic approaches; the ability for visualisations to demonstrate concepts. A workshop later in 2010 will use a state-pressure-response framework to examine some of these questions, as this provides a practical approach for bringing together concepts and visual methods (Wolfslehner and Vacik, 2008).

Visualisations

A selection of concept-driven landscape visualisations will be piloted, incorporating details gained from the representation research. This may necessitate trialing a number of software systems. Regardless of software approach used, the design approach is intended to ensure that the visualisations created reflect, as best possible, the values of the stakeholder communities.

Prototype views will be tested on stakeholders in collaborative fora to refine the design process.

CONCLUSION

The described steps provide a template for the design of landscape-based visualisations for communications on sustainable forestry in New Zealand. A significant effort remains to achieve them.

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