

Exploring community values assigned to natural assets on the Moolort Plains, Victoria

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Executive summary

A qualitative study exploring community values for three natural assets on the Moolort Plains in central Victoria was undertaken between April and June 2008. Semi-structured interviews were conducted with 17 people (representing three NRM community-types) to explore community values assigned to the Moolort wetlands, an upper reach of the Loddon River and for Buloke Grassy Woodland vegetation. Factors affecting value formation, including held values, were also investigated.

The NRM (natural resource management) community typology developed by Harrington et al. (2008) was used as a basis for identifying interview groups. The Moolort study focused on 'communities of locality' (communities based around 'place' and divided into an urban and rural category); 'communities of practice' (in this case NRM professionals and farmers); and a 'community of interest' (based on members of 'Friends of' and Field Naturalist groups).

Interviewees were purposively selected with the aim of covering three different community-types and for each of the three assets. We also selected interviewees to ensure a spread across a range of social variables that have been identified as affecting assigned values (e.g. gender, Landcare membership, status of residency).

Findings from this research will underpin development of a mail survey instrument that will form the basis of a quantitative study of assigned values (and factors influencing value formation) for the three assets. While research findings will be of interest to regional stakeholders, our focus is on the development of a cost-effective method for including community values in regional decision making about the allocation of resources across natural assets.

'Held values' are guiding principles that people hold as very important, whereas 'assigned values' are those which people attach to particular environmental goods and services. Numerous social factors can influence the formation and expression of such values. Values are said to influence our beliefs, norms and behaviour and are triggered by our concern for the well being of ourselves, other people and/or the environment. This notion is reflected in value-belief-norm theory (Stern et al. 1993). An understanding of the values individuals hold and assign to natural areas should therefore be helpful in designing effective communication strategies, assisting in conflict resolution and ensuring that priorities for resource allocation are socially acceptable.

Interviewees attached a wide range of values to the three assets. Data analysis suggested that these assigned values fell into 11 categories. Some values were attached to all three assets, whereas others were related to one or two assets. Values assigned to the three assets included 'life-sustaining' value, 'recreation', 'aesthetic', 'biological diversity', 'economic', 'existence' and 'historical' value. The Loddon River had additional values, including 'community', 'therapeutic' and 'future' value. There was a low incidence of 'existence value' which was only raised in relation to Buloke Grassy Woodland.

For the Moolort wetlands, farmers reported the widest range of assigned values compared to other community groups. In general, females valued the community, therapeutic and aesthetic values of the Loddon River; whereas males valued the biological, economic and existence values. For Buloke Grassy Woodlands, only farmers mentioned economic value.

A number of factors were hypothesized in this study as affecting assigned values. Held values are an important influence. Held values were categorized in this study as egoistic, social-altruistic and biospheric. The study showed that even if individuals shared the same held values about the environment, the values assigned to particular assets could be quite different and wide ranging.

There are a number of other factors that also play an important part in assigned value formation:

- Socialisation processes: family life, interaction with nature during childhood and formative years, influence of relatives and mentors, interaction with nature through recreation or hobbies;
- Involvement in local groups and organizations;
- Economic factors (agricultural production and sustainable land use issues);
- Gender;
- Occupation (farmer compared to non-farmer); and
- Location in relation to the natural asset being valued.

This pilot study has provided a useful basis for the development of a survey instrument that will further explore assigned values, and influencing factors, for three natural assets on the Moolort Plains.

1. Introduction

An understanding of the values that people hold for natural places is an important influence on decision-making regarding the management of natural areas (Layden et al. 2003). Human environmental values are said to take two forms; 'held values' which are guiding principles that people hold as very important to them (Lockwood 1999); and 'assigned values' which individuals attach to environmental goods or services, expressing something's worth compared with something else (Brown 1984). The values that we assign to natural areas are said to underpin our attitudes and environmental behaviour (Kaltenborn and Bjerke 2002). An understanding of the values that people hold and assign to natural areas is therefore useful for designing effective communication strategies, assisting in conflict resolution and ensuring that priorities for resource allocation are socially acceptable.

Regional partnerships between government and communities have become the preferred model for NRM (Natural Resource Management) in Australia with the formation of 56 regional NRM bodies. Although arrangements vary between states (Robins and Dovers 2007), they all have the primary focus of working with the community to plan and prioritise public funding; develop regional plans and oversee the implementation of these plans. Consensus-based decision-making with local stakeholders (Curtis et al. 2002) and conflict resolution (McGinnis et al. 1999) are major roles of regional NRM bodies.

With shrinking NRM budgets and increasing land and water degradation, it is unlikely that all natural areas in regions can be protected. Hence, an asset-based approach where NRM investment is made in specific high-value natural 'assets' is likely to overtake an issue-based approach where funding has been allocated to address specific land and water degradation. The Victorian and Western Australian state governments are most advanced in promoting an asset-based approach to NRM. With asset-based investment, it is important to have a transparent basis for deciding which assets are of high value and worthy of protection.

Rivers, native vegetation and wetlands are three examples of natural assets that regional NRM bodies aim to conserve and protect in partnership with landholders. A number of research disciplines or approaches can be employed to assess the value of these assets. These include ecological approaches such as rapid assessment tools (Ladson et al. 1999), various economic techniques such as non-market valuation (Adamowicz 2004) and social science approaches to elicit community values towards certain natural areas (Tarrant and Cordell 2002; Curtis and Robertson 2003). It is the latter approaches that seem to be under-utilised by regional NRM bodies and which are the focus of our research.

There has been limited use of social science techniques for informing regional NRM decision-making (Curtis et al. 2005). In particular, there are few examples of Australian research exploring the influence of assigned values on the conservation behaviour of landholders and the relative importance of held values as a factor contributing to assigned values. Value-belief-norm (VBN) theory (Stern et al. 1993, 2000) offers a useful framework for explaining the links between values, beliefs, norms and environmental behaviour. This behavioral model was developed in the United States and has been widely applied internationally. VBN theory is based on the notion that environmental behaviour can be triggered by an individual's concern about environmental consequences for themselves, other people and/or the environment (Stern et al. 2000). Even though VBN is a widely used social-psychology model, it has not been employed in Australia to explore people's behaviour regarding specific environmental assets.

Our research aims are:

1. To identify the range of assigned (or attached values) across different community types for three natural assets in the study area.
2. To identify some of the factors (or variables) shaping assigned values.
3. To inform the development of a mail survey.

The following report is of preliminary research based on interviews with 17 people, representing three different community-types in the Moolort Plains area of Victoria. Each interviewee was asked about his/her values for one of three natural assets in the local area (the Loddon River, Moolort wetlands and Buloke Grassy Woodland vegetation). The data gathered from these interviews will underpin the development of a mail survey to explore assigned values of different communities towards three natural assets in greater depth.

2. Background

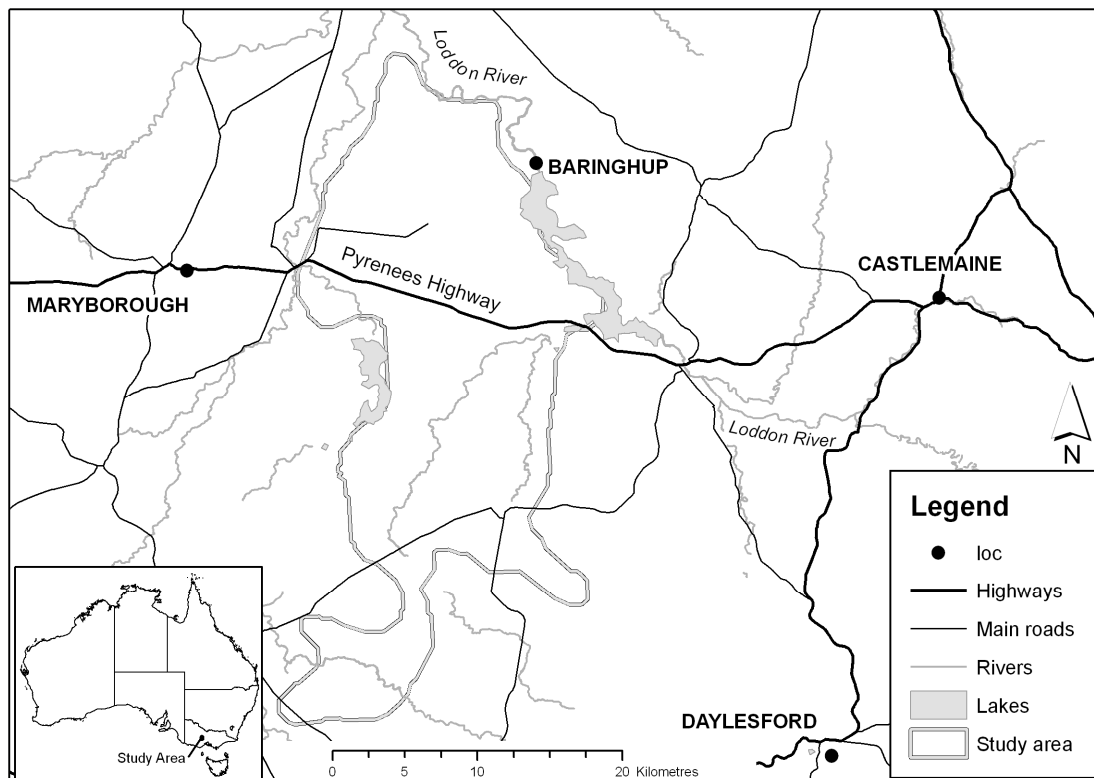
2.1 Study area and asset description

The study area, the Moolort Plains, is located in the North Central region of Victoria (37.078° S 143.927° E) and can be found within the Loddon River catchment, approximately 150 km north of Melbourne [Figure 1]. The Moolort Plains has been extensively cleared for agriculture (approximately 80% cleared), with sheep grazing and cropping the major land uses (Matthews 2008). Extensive gold mining occurred in large portions of the study area during the 1850s and continues in some areas today. The mean annual rainfall of the area is approximately 524 mm/year but annual rainfall totals have been substantially lower over the last 10 years.

The Moolort Plains was selected for the research pilot because there are three distinct natural assets in a small geographic area [Figure 1] and a diversity of community-types. Larger townships within the study area include Maryborough and Castlemaine (with populations of 7,481 and 8,700 respectively). A number of small rural centres with populations between 400 and 1,000 also occur in the study area, including Maldon, Newstead, Guildford and Carisbrook. The district has a high population of lifestyle/absentee landholders (NCCMA 2003) as well as 205 commercial farms within Mt Alexander shire (National Economics 2004). Community NRM is particularly active through an extensive network of Landcare and 'Friends of' groups (Greening Australia 2003).

Figure 1

Location of study area



The three environmental assets chosen for this study are:

Loddon River reach

The Loddon River is 430 km in its entirety and flows from the Great Dividing Range near Daylesford, through to the Murray River near Swan Hill (NCCMA 2005). The Upper Loddon is the focus in this study and consists of the reach located between the townships of Vaughan Springs and Baringhup. These reaches support a number of threatened flora, fauna and vegetation communities (NCCMA 2005). However, the quality of this environment is threatened by weeds and stock access and the extraction of water in the upper Loddon for irrigation and urban use (Matthew et al. 2008). The physical form and quality and quantity of vegetation along the river is said to be 'substantially modified' (NWC 2005).

The Moolort Plains Wetlands

The Moolort wetlands consist of a chain of swamps found on a large basalt plain between Castlemaine and Maryborough. A number of these swamps, in wet years, are important habitat for migratory and wading birds. The Moolort wetlands include Frogmore Swamp (32 ha in area), Long Swamp (40 ha), Saligari Swamp, the Clunes Swamps and a number of tangled lignum swamps (Anon 1994; Anon 1992; Hogan 1997). The swamps are classified as either red gum wetlands, freshwater meadows and/or shallow freshwater meadows (DSE 2004). The swamps have been largely dry for the last decade. Whilst some of the swamps have been fenced to manage stock access, a number have been grazed and cropped.

Buloke Grassy Woodland

This vegetation asset is an endangered ecological community under Commonwealth legislation. The dominant tree species is the Buloke (*Allocasuarina luehmannii*) which also occurs with Slender Cypress Pine and Grey Box. This ecological vegetation class (EVC) is also characterised by the absence of a tall shrub layer but has a well-developed grassy layer with some herbs present (Thackway and Creswell 1995). Buloke Grassy Woodland is an important food source for the South-Eastern Red-Tailed Black Cockatoo (DEWHA 2008). Buloke Grassy Woodland typically occurs on sandy soils that are prone to erosion as a result of overgrazing by sheep and rabbits. The Bulokes have been largely cleared and those remaining have been severely affected by over-grazing and are now found only as scattered remnants and isolated paddock trees on private land and roadsides. The native grasslands that are associated with the Bulokes have been largely cleared for cropping or pasture improvement although some remnants can be found on roadsides and unproductive rocky areas on private land.

2.2 Community types studied

With the shift to community-based regional NRM, there has been renewed focus on what is meant by 'community' in NRM. Brown et al. (2002, p. 52) found communities to be 'relatively distinct spatial areas that reflect local values, attitudes and lifestyles'. In line with this, 'community' is often used to refer to the role of farmers and landholders in NRM decision-making. Broderick, however, sees community as 'a dynamic entity comprised of individuals who interact through various practices and in particular places' (2005, p.289) and suggests that a much wider view is needed, one that includes other stakeholders such as urban residents, Indigenous people and other groups who use natural areas. Broderick continued to explain 'community' as a 'complex social phenomenon in place

and space' (Broderick 2005, p. 290) and stressed the need for future research to allow for differences within and between communities. Similarly, Lane et al. (2005) argued that NRM focus should be much wider than place-based community groups and should include broader networks of common interests and concerns.

Building on this and other literature, Harrington et al. (2008) developed a typology of communities for NRM that includes those related to space, practice, interest and identity. This typology appealed as a useful way to explore environmental values within and between communities in the Moolort study.

We have used three of the Harrington et al. (2008) categories of community: place, practice and interest. These are explained below.

- Communities of locality: Also known as 'communities of place', these communities are located within political, social or physical boundaries (Harrington et al. 2008). In this study we look at communities in small rural population centres and in towns.
- Communities of practice: These groups are structured around an activity or common practice and can be spatially diffuse (Harrington et al. 2008). The communities of NRM professionals/practitioners and farmers are the focus of this study.
- Communities of interest: These are groups bound together by other common identities such as culture, age, gender, networks or politics (Harrington et al. 2008). Environmental 'Friends of' groups provide an example of a community of interest in the Moolort study.

2.3 Environmental values (held and assigned)

Environmental values can be described in terms of *held* values and *assigned* values. *Held* values are the most basic of human values and are described as ideas or principles that people hold as important to them (Lockwood 1999) and have also been called *underlying values* or *values proper* (Rescher 1969). Patterns of these held values are known as *value orientations*. *Assigned values* are the values that individuals attach to particular environmental goods, activities and services (Lockwood 1999) and are essentially the products of personal and collective choices (Peterson 1996). These values may be in relation to present or future use (Lockwood 1998). It is important to note that held values reflect individual's general environmental concern whereas assigned values are expressed in relation to a particular thing (i.e. a river, wetland, forest).

The major focus, internationally, in social-psychology has been the study of held values and their relationship with pro-environmental behaviour. There has been little research regarding assigned values; and even less concerning the links between held and assigned values (and the factors that influence assigned value formation). Our study was based on the hypothesis that for natural resource management, assigned values may be a more useful predictor of environmental behaviour.

Assigned values were the focus for the Moolort study in relation to three natural assets – the Loddon River, Moolort wetlands and Buloke Grassy Woodlands. Assigned values have been explored in the literature (but to a lesser extent than held values) for a range of natural assets including forest management (Tarrant and Cordell 2002); landscapes and place attachment (Brown et al. 2002); wetlands and forests (Winter and Lockwood 2004); remnant vegetation management in agricultural areas (Moore and Renton 2002);

and river frontages (Curtis and Robertson 2003). Table 1 describes some of the assigned values explored in the above studies.

Table 1

The range of assigned values explored in four previous studies

Study	Context	Assigned values explored
Tarrant and Cordell (2002)	forests	Utilitarian, life support, aesthetic, spiritual value.
Brown et al. (2002)	landscapes	Aesthetic, economic, recreation, life sustaining, learning, biological diversity, spiritual, intrinsic, heritage, future, therapeutic, wilderness value.
Moore and Renton (2002)	remnant vegetation	Ecological, aesthetic, functional, community value.
Curtis and Robertson (2003)	river frontages	Environmental, economic, social values.

The held values of interviewees were also explored in this study. Held values are one of the factors influencing assigned value formation. By studying held values it is possible to explore the deeply held principles that inform people's assigned values, environmental attitudes and behaviour (Kaltenborn and Bjerke 2002). Much of the conflict over the environment has been attributed to basic differences in stakeholders' value orientations (Layden et al. 2003).

3. Methods

3.1 Theoretical basis: value-belief-norm theory

VBN theory is a framework used to explain individual's motivation for environmental behaviour. It is based on a chain of elements where one component influences the next. These elements are values, beliefs or worldviews (awareness of consequences, ascribed responsibility beliefs and general environmental concern), personal norms and behaviour. VBN theory states that an individual's value orientation biases them to select and believe in information that aligns with their values, and that they deny information that is not (Stern 2000).

VBN was built on Schwartz's norm activation model (Schwartz 1977), which focuses on the influence of altruism on environmental behaviour. Early development of the model was based on three value orientations (egoistic, altruistic and biospheric) that may underlie environmental behaviour (Stern et al. 1993). People with egoistic held values are likely to protect the aspects of the environment that affect them personally. Those people with altruistic concerns are primarily focussed on the welfare of others, whereas those with biospheric value orientations are concerned mostly with the well-being of all living things.

Early application of VBN focussed on values and beliefs about environmental consequences and the hypothesis that pro-environmental behaviour is more likely if the individual feels that there may be adverse consequences for something that they value (self, others or the biosphere) (Stern et al. 1993). The VBN model claims that all three value orientations can contribute to pro-environmental concern under

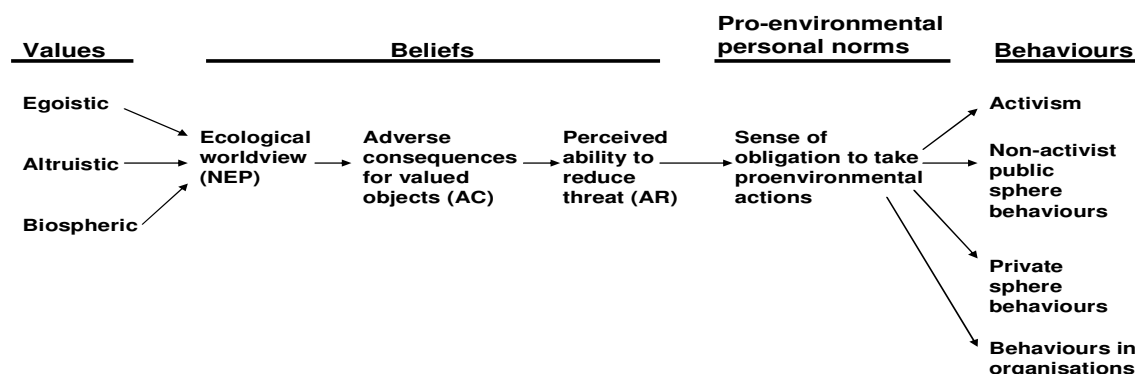
various conditions and behavioural intention can be measured to explain this (Stern et al. 1993).

Later development of VBN (Stern et al. 1999) introduced the ‘beliefs’ category (ascribed responsibility) and also added personal norms and their influence on pro-environmental behaviour [Figure 2]. Ascribed responsibility beliefs are the beliefs where individuals feel they can help to alleviate an environmental threat, thereby restoring the things that they value (Stern 2000). A personal environmental norm can be described as an individual’s sense of moral obligation to act to preserve the environment (Stern 2000).

VBN has been applied widely as a useful framework to explore the motivational determinants of environmental behaviour and as an empirical way to account for the different types of environmental support (Stern et al. 1993; Nordlund and Garvill 2002; Garling et al. 2003; De Groot and Steg 2008).

Figure 2

Value-belief-norm theory (Stern and Dietz 1994)



In the Moolort study, the ‘values’ component of VBN was used as a useful way to categorise held values. The full VBN model will be tested in a subsequent and much more extensive quantitative study of the three assets and community types.

3.2 Interviewees and recruitment

We aimed to interview between 15-20 people to enable us to cover the three assets (wetland, river, vegetation) and three types of NRM communities including:

- Place-based community: urban residents (living in towns with populations over 5,000 people); and rural centre residents (residents of towns with a population of less than 1,000 people).
- Practice-based community: NRM professionals (those individuals with an occupation in NRM in the local area); and farmers.

- Interest-based community: Members of 'Friends of' groups, in this case field naturalist groups.

Based on the research team's experience in conducting landholder surveys (Curtis et al. 2008; Curtis and Robertson 2003), interviewees were purposively selected to cover a range of additional social factors identified as important influences on values and behavior in an environmental context. As far as possible we intended that our informant cohort should mirror the wider rural community. A matrix was prepared as a checklist to ensure that an appropriate cross section of informants for each asset-type was selected [Table 2]. Social factors considered when selecting our informants included;

- Gender (at least 30% of the sample were to be women)
- Absentee and permanent residents (20% absentee landholders in sample group)
- Farmers and non-farmers (40% of sample to be non-farmers)
- Urban and rural residents (30-50% should be urban or rural centre residents)
- Long-term and short-term residents (70% of sample should be long-term residents, having lived in the area for longer than 10 years).
- Landcare members and non-Landcare (40% of sample should be Landcare members).

In the first instance, three local community members (two NRM staff and one leading farmer) were approached to assist with selection of possible interviewees. A 'snowballing' method was also used where informants suggested other people who might consent to be interviewed and fitted the categories identified. Potential interviewees were contacted by telephone. An information sheet was sent to them with an explanation of the research project. Interviews were then arranged at convenient locations and times.

Table 2

Description of Moolort study interviewees

	1. Place-based, n = 7		2. Practice-based, n = 7		3. Interest-based ('Friends of'), n = 4
	1.1 Urban, n = 3	1.2 Rural centre, n=4	2.1 NRM professionals, n = 3	2.2 Farmers, n = 4	
Loddon River interviewees (n = 6)	#14 NLC, M, PR, ST	#17 LC, F, ABS, ST #8 NLC, F, ABS, ST, SF	#13 LC, M, PR, LT	#15 NLC, F, PR, ST	#12 NLC, M, PR, ST
Moolort wetlands interviewees (n = 7)	#2 LC, M, PR, LT	*#10 LC, M, PR, LT, SF #16 (LC, F, PR, LT, SF)	#4 NLC, F, PR, LT	*#1 LC, F, PR, LT *#3 LC, F, PR, LT	#11 NLC, M, PR, LT
Buloke Grassy Woodland interviewees (n = 7)	#7 NLC, M, PR, LT	*#10	#9 NLC, M, PR, LT, SF	*#1 *#3	#5 NLC, M, PR, LT #6 NLC, F, PR, LT

LC = Landcare member, NLC = not a Landcare member, F = female, M = male, PR = permanent resident, ABS (absentee resident), LT = long-term resident (>10 years), ST = short-term resident (<10 years), SF (small/part-time farm), * indicates that respondent discussed more than 1 asset.

Table 2 provides a summary of the interview participants according to asset and community type. A total of 17 people were interviewed between March and June 2008. The sample included nine males and eight females. Landcare membership was reported by seven interviewees. Most (15) interviewees were permanent residents with only two absentees. Most interviewees (12) were long-term residents, having lived in the area for longer than 10 years. There were a total of seven farmers, with three of these on small properties (less than 10 ha) or part-time farming. Property size varied with nine interviewees living on a property of less than 10 ha; two interviewees with properties between 10-20 ha; one person with a 21-50 ha property; and the remaining five interviewees on properties greater than 50 ha. A total of seven people were interviewed about the Loddon River, seven for the Moolort wetlands and seven for Buloke Grassy Woodland. Although each interviewee was only asked about one of the three assets, three individuals indicated during the interview that they wanted to mention another asset. These interviewees were landholders who had both wetlands and Buloke Grassy Woodland on their property.

Seventeen is a small sample size for comparative studies, particularly when results are presented for each of the asset classes or community-types. However, this was an exploratory pilot project aimed at exploring the range of values assigned to natural places, rather than providing a comprehensive understanding of values across the different community groups.

3.3 Data collection method

Interviewing was selected as the most appropriate way to explore the range of held and assigned values of informants. Interviewing was considered to be an ideal method because it is well-suited to the exploration of perceptions and opinions and the interviewer is able to probe for further information (Bryman 2004).

A semi-structured interview approach was employed. Interviews were structured around the following schedule, with minor changes to accommodate the different asset types (e.g. Loddon River featured below):

- Are you interested in the local environment? Why or why not?
- If yes, what was it that developed this interest?
- Is the Loddon River important to you?
- What is it about the river that has value for you?
- Do you think the Loddon River has a valuable role in the wider ecosystem?
- Do you think the Loddon River is a valuable resource for the rest of the community?

The Moolort area, like much of south-eastern Australia, has been in drought for the past decade. This has had a major impact on the wetland and river assets. For this reason, interviewees were asked to remember the values they had for the Loddon River and Moolort wetlands under normal rainfall conditions.

Interviews lasted between 30 and 60 minutes, after which an additional question sheet was completed to provide demographic information. Interviews were tape-recorded and fully transcribed later.

3.4 Data analysis

Data analysis aimed to explore three different facets of the data:

- The range of assigned values that various individuals had for the three natural places,
- The held values relating to an individual's general environmental concern (not related to a particular asset),
- The other factors or variables that had an influence on the values assigned to the three assets.

For exploring assigned values a mixture of an inductive and deductive approach was used. The interview transcripts were initially manually coded using a mind mapping process. Mind maps are simple diagrams which are drawn on paper to sort and show relationships between themes. Although participants used their own words to describe their values for the three assets, a number of clear thematic categories emerged. Assigned values were initially sorted into broad categories of economic, social and environmental themes. For example, when the river was described as 'gorgeous to look at', this statement was interpreted as a social assigned value. When the native grasslands (associated with bulokes) were described as 'good feed in summer for stock', this was interpreted as an 'economic' assigned value.

Within the categories of 'social', 'economic' and 'environmental' assigned values, further themes emerged that fitted well within 11 categories of assigned values identified from the literature (Satterfield 2001; Brown 2005). In her research into value literacy for the environment, Satterfield developed a coding scheme of 25 values based on Rolston (1994). Seven of Satterfield's categories were identified in our analysis of the Moolort interview data [Table 3]. The remaining four categories closely matched four of the 14 categories of assigned values identified by Brown (2005). NVivo (a qualitative research software program) was then used to code and sort data into the 11 categories of assigned value [Table 3].

Table 3

Categories and descriptions of assigned values used in the Moolort study

Assigned value category	Description
Aesthetic value	Beauty in the landscape (Satterfield 2001/Rolston 1994) and also including sights, sounds and smells.
Economic value	Commodity value of extracted natural resources (Satterfield 2001/Rolston 1994).
Recreational value	Nature providing physical challenges, something to watch and a place to build skills (Satterfield 2001/Rolston 1994).
Life sustaining value	Natural places that produce, preserve, clean and renew air, soil and water (Brown 2005).
Learning value	Valuing areas because they are used to learn about the environment (Brown 2005).
Biological diversity value	Valuing natural areas because they provide places for a variety of fauna and flora (Brown 2005).
Existence value	Valuing a natural place simply because it is out there, even if you may not see it (Satterfield 2001/Rolston 1994).
Future generations value	Recognising the value of the rights of future generations to a healthy environment (Satterfield 2001/Rolston 1994).
Therapeutic value	Valuing a natural place because it makes people feel better, physically and/or mentally (Brown 2005).
Community value	Valuing the idea that humans are members of a biotic community (Satterfield 2001).
Historical/evolutionary value	The value of landscapes as a record of past processes of natural and human history (Satterfield 2001/Rolston 1994).

For exploring held values, a deductive approach was used. The content of each transcript was read for individual's general values. It could be inferred from the data that individuals had both dominant and secondary values based on the three broad categories of VBN theory (egoistic, altruistic and biospheric values). If more than one held value was present, the dominant and secondary value was identified.

Finally, an inductive approach, assisted by working with NVivo, was used to explore the factors or variables that influence assigned value formation. The emerging themes included; socialisation processes, economic factors, gender, occupation, level of interaction with government departments and location of respondents in relation to the assets.

The data presented in the follow section of this report show the range of assigned values for each asset across different community-types. Quotes are included to support these findings. A participant number is included at the end of each quote and in tables throughout the report. These numbers identify the participant by community type and asset, but do not reveal their actual identity.

4. Results

4.1 Exploration of assigned values

The interviews highlighted a wide range of assigned values for the three assets. The type and importance of these assigned values varied across different community types [Tables 4, 5 and 6]. The tables used in this section identify the different assigned values using interviewees own words (column one); a summary typology for assigned value-types based on the work of Satterfield (2001) and Brown (2005) (column two); and description of the community type for each respondents (column three).

The following section summarises the values informants assigned to each asset. Interviewee quotes are included to describe the different values. A more in-depth analysis of the data is provided in subsequent sections.

4.1.1 Assigned values for the Moolort wetlands

Seven interviews explored values assigned to the Moolort wetlands (including one interviewee who answered in relation to the wetlands and Buloke Grassy Woodland). The community-types represented in these interviews included: three place-based interviewees (one urban, two rural centre), three practice-based (one NRM professional and two farmers) and one interest-based community member ('Friends of' group member). A range of assigned values for wetlands were raised during the interviews [Table 4].

The value of the Moolort wetlands for biological diversity and habitat was widely cited. The wetlands were said to have supported a variety of birdlife and were valued highly for the red gums found in them. They were seen as an oasis in the middle of an area dominated by agricultural activity:

I look at the Moolort swamps as an island ... important because of the wildlife they can harbour in an intensive agricultural area [#4].

A closely related value of the swamps was their role in sustaining life. The interviewees spoke of the swamps' significance in bird migration patterns. The farmer interviewees, who had swamps on their land, had paid close attention to bird migration over the years and talked about their role in linking up a series of wetlands throughout Victoria. The swamps were also said to have value as linking corridors for local fauna:

Clearly they are a linking point across the plains, habitats for mammals and birds moving from one patch of bush to the next [#11]; and

I guess we saw them as refuges and places for the birds in the midst of the grasslands [#3].

A number of interviewees spoke about the learning value of the swamps. The Moolort wetlands have been studied during the 1980s and 90s, particularly in a salinity context. Thus their role in contributing to knowledge was mentioned by several interviewees. For example, one participant felt that the swamps were important for improving knowledge and changing attitudes about the environment:

The swamps have an educational value themselves, but it's the attitudes and the knowledge that you want to get across to the younger people about what to appreciate and think about [#1].

In past years the swamps were used for hunting of ducks and foxes, though this activity has become rare because of lack of water. The major recreation value would now appear to be nature study:

We were just passionate about finding birds and there were birds out on the swamps that we couldn't see anywhere else...We spent a lot of time out there [#11]; and

I used to go to the swamp and look at all the birds. I wrote up a list...I'd take my binoculars down and have a great time. I used to go down there nearly every day [#1].

The economic value and agricultural use of the swamps was discussed widely. The tension between agricultural use and the need to protect the swamps was a strong theme. Some informants appeared to provide conflicting information about drainage of the swamps. The farmers spoke about fencing off and protecting the swamps, while the urban and some rural centre interviewees were concerned that the swamps had already been drained. One farmer reported that the value of the swamps among landholders was well known and efforts were being made to set them aside from agriculture:

It was quite clear that farmers understood that even though the pressure was on to clear more land, you cropped around the wetlands rather than through them [#3].

Although most of the Moolort swamps had been fenced off by landholders, the on-going drought had increased the need to utilise these areas for grazing:

We locked up the swamps, but as the dry came along all of a sudden we had to put them back into agriculture on a short-term basis. I know a few farmers who have had to put their sheep in the swamps [#16].

The Moolort swamps were also highly valued for their aesthetic value. Interviewees spoke of the beauty of the swamps when they had water in them:

Well it was just such a beautiful atmosphere being around out there [#11]; and

The swamps were beautiful, they were absolutely exquisite with their majestic red gums, they were full of bird life, things wading around. They were an absolute oasis, even in agricultural land [#3].

Two interviewees mentioned that it was highly likely that the swamps had indigenous heritage value. However, the extent of Indigenous cultural heritage values was unknown. There was one reference to the swamps as 'just having a place', suggesting an existence value.

Table 4 provides a summary of the range of descriptions that interviewees used to describe the value of the Moolort wetlands. These descriptions are categorised into an assigned value-type.

Table 4**Values assigned to the Moolort wetlands by participants (N = 7)**

Assigned value (interviewee terms)	Assigned value type (technical terms)	Community-types
'Habitats for all sorts of things', 'refuges in agricultural land', 'places for the birds', 'good nesting places', 'wildlife corridors', 'a richer environment', 'land looking after itself', 'variety of life'.	Biological diversity	3 place-based (1 urban, 2 rural centre), 3 practice-based (2 farmers, 1 NRM professional, 1 'Friends of' member).
'Important for bird migration', 'important for animal migration', 'important ecosystems'.	Life sustaining value	2 place-based (1 urban, 1 rural centre), 1 farmer, 1 'Friends of' member.
'Visited for school excursions', 'educational for changing attitudes', 'intriguing', 'focus for learning', 'getting townies involved', 'monitoring', 'counting birds', 'measuring salinity'.	Learning value	3 rural centre residents, 2 farmers, 1 NRM professional.
'Looking at birds', 'interesting to visit', 'looking at the plants', 'watching nature', 'chasing birds', 'duck shooting', 'rabbit shooting'.	Recreation value	3 rural centre and 1 urban resident, 1 farmer, 1 NRM professional.
'We let sheep in to graze', 'shelter for sheep', 'drained for crops', 'drained for pasture', 'cultivate right up to swamp', 'needed for grazing in the drought'.	Economic value	2 farmers, 2 rural centre residents, 1 NRM professional
'Beautiful', 'exquisite', 'absolute oasis', 'delightful places', 'beautiful atmosphere'.	Aesthetic value	2 farmers
'Heritage that ought to be preserved', 'Aboriginal stuff'.	Historical value	1 Rural centre resident, 1 farmer
'It has all got a place'	Existence value	1 rural centre resident

Given the relatively small sample size (N=7) it is difficult to link assigned value to community types or social factors. Rather, this study provides an insight into the range of assigned values that people (within and between community types) have for the Moolort wetlands. The biological diversity value of swamps was highlighted by all seven interviewees. The farmers recognised and reported the widest range of values and uses for the swamps. The urban resident valued biological diversity and recreation opportunities, which is not surprising given that he is a field naturalist member. There was a relatively even spread of males and females for almost all assigned value, suggesting that gender may not be a significant factor. However, that the 'life sustaining' value was raised predominantly by men suggests that this may warrant further study.

4.1.2 Values assigned to the Loddon River

A total of six people were interviewed regarding the Loddon River. These included two place-based interviewees (one urban, one rural centre), three practice-based (two small farmers and one NRM professional) and one interest-based (one 'Friends of'/Field Naturalist member).

The river asset seemed to attract a greater range of assigned values (ten categories) than was the case for the wetland asset (eight categories). The additional categories of

assigned value including 'therapeutic/spiritual' value, 'future/stewardship' value and 'community' value. 'Learning value' was not highlighted by any of the river interviewees.

The 'life sustaining' value of the river was mentioned by all interviewees, indicating that they all felt that the river was central to the wellbeing of their community and beyond. The river was described using terms such as the 'lifeblood', 'arteries in the landscape', the 'heart of the landscape'. The value of the Loddon River as something that sustained the lives of everything around it was widely acknowledged:

The river is the lifeblood. It's what links us to the Murray River, what links us to Adelaide, the rest of the state. You see yourself in relation to everybody else on the river [#14]; and

It changes everything, everybody is affected by it in some way or another [#14]; also

I don't think we could exist without it [#8].

Interviewees also assigned a high level of importance for the recreational values of the Loddon River, although they noted that recreational opportunities had diminished during the drought. Recreation values identified by interviewees included swimming, fishing, bushwalking, nature study and picnicking:

The swimming hole at Vaughan Springs was noted for its water quality. I've had my kids up there swimming, it's beautiful [#13].

Aesthetic value also featured strongly in the interviews. This was not only the way the river looked but also its peaceful atmosphere, sounds and smells.

A range of biological values were assigned to the river. The high-quality riparian habitat in the upper reaches of the river was valued by several interviewees. The river was also seen as a place where rare and threatened species live. The river was valued as habitat for birds, fish and land animals:

The riparian areas are so good, and the fauna in those areas. That is a pleasing attraction to most people along there [#13].

An additional category of assigned value was raised in context to the river; 'community value'. This refers to the value of the river as a community asset or focus to bring the community together. The Loddon River as a community asset was a strong theme emerging in the interviews, particularly from people in Guildford and Newstead. This value didn't come up for the wetlands or vegetation. This is probably because the river is more accessible to the public than the other two assets, is perceived as the 'lifeblood' of the community and physically links areas:

People use it as a gathering point. It's significant for that purpose in the local community [#17].

The river also has an important economic value. The part of the Loddon which dissects the study area is the upper reach. Agricultural use of irrigation water is relatively minor compared with the lower reaches. Nevertheless the river has important value for grazing and for irrigation for a number of small organic landholders and larger-scale farms between Guildford and Newstead. As was the case with the wetlands, economic use was often reported by non-farmers as a factor affecting environmental condition:

Most of the land along the river is grazing land. Farming people are very reluctant to give up a blade of grass, let alone 12 feet of grazing frontage [#13].

One producer described her use of the Loddon for irrigation, and the tension she felt in doing this:

I irrigate and I realise that it's not ideal and that I'm impacting on the river system [#15].

Three interviewees felt that the river had a therapeutic or spiritual value, such as expressed in this quote:

Besides the obvious joy of hanging out in such a pristine place, drinking the clean water...these sorts of things are almost indescribable pleasures, you know what I mean? [#14].

A couple of statements appeared to reflect the existence value of the river. When one interviewee was asked what they valued about the river, they replied; 'well just because its there'; and that 'the river is greater than all of us'. Another replied:

Everyone around here just knows innately that the river is alive and without it we are all fu#ed, basically. It's a rich thing that enriches people, just being able to be near it. I think everybody has the same deep appreciation of it [#15].*

One interviewee discussed the future use value, or need for stewardship of the river:

You've got to look after it for the next person to nurture it [#8].

Finally, the river has an interesting history, both pre-European and around the goldrush history. This was valued by two interviewees:

The history of the river is immensely interesting [#17]; and

Some parts of the river are examples of pre-European times. They could be an example for future generations of what the country used to look like [#12].

Table 5 provides a summary of the range of descriptions that interviewees used to describe the value of the Loddon River. These descriptions are categorised into assigned value-types.

Table 5

Values assigned to the Loddon River by participants (N=6)

Assigned value (interviewee terms)	Assigned value type (technical terms)	Respondent description
'We can't exist without it', 'interacts with other rivers', 'looking after the river for downstream users', 'heart of the landscape', 'lifeblood', 'most important part of the landscape'.	Life sustaining value	All interviewees discussed the life sustaining value of the river.
'Swimming', 'fishing holes', 'camping', 'place for picnics', 'watching nature', 'walking tracks', 'joy in bringing back the animals'.	Recreation value	All respondents in this category spoke about the recreation values of the river. Swimming was mentioned by all.
'Gorgeous place', 'aesthetic value of riparian areas', 'I enjoy looking at it'.	Aesthetic value	2 rural centre residents, 1 small farmer, 1 NRM professional.
'Threatened species', 'valuable riparian habitat', 'valuable red gums', 'habitat for fauna', 'aquatic habitat', 'bird habitat', 'more biodiversity around rivers', 'habitat corridors', 'high-value streams'.	Biological diversity	2 rural centre residents, 1 'Friends of' member, 1 small farmer, 1 NRM professional.
'A place where people gather', 'nobody owns it', 'an artery for communication', 'brings us together', 'a community space'.	Community value	2 small farmers, 1 rural centre resident.
'A drain for agriculture', 'drinking water', 'grazing land', 'stock water', 'irrigation', 'groundwater and bores'.	Economic value	2 small farmers, 1 NRM professional.
'Being in the country', 'feel comfortable around it', 'it's sentimental for me', 'enriches people', 'an indescribable pleasure', 'it's peaceful'.	Therapeutic value	2 small farmers, one rural centre resident.
'Our main river', 'is in our subconscious', 'the only river around'.	Existence value	2 rural centre residents, 1 small farmer, 1 NRM professional.
'Look after it for next person', 'preserve for future generations'.	Future generations value	1 small farmer.
'Historically interesting', 'indigenous value', 'example of pre-European Australia', 'Aboriginal grinding grooves'.	Historical value	1 rural centre resident, 1 small farmer, 1 Friends of' member.

Again, it is difficult to identify trends from a small sample. All community types picked up on the life-sustaining and recreational values of the river. The small farmers in this category placed high importance on community and therapeutic value of the river, followed then by economic value. Perhaps the result would be different from large commercial landholders.

It should be noted that the majority of respondents in this asset category were short-term residents, which may explain the focus on community and spiritual/therapeutic values. It is possible that these residents (small farmers and rural centre residents) moved into the

area from the city to feel part of a community; and that such natural places have an important therapeutic value for them that only living in the country can provide.

Females were more likely than males to rate the community, therapeutic and aesthetic values of the river, whereas males were more likely to rate the biological, economic and existence values. Landcare membership didn't appear to be associated with any patterns in the values informants assigned to the river.

4.1.3 Values assigned to the Buloke Grassy Woodlands

Seven informants were interviewed regarding Buloke Grassy Woodlands. Five of these interviews focused on Buloke Grassy Woodlands and two interviewees spoke about wetlands *and* the Buloke Grassy Woodland remnants on their properties. Interviewees included two place-based (one urban, one rural centre resident), one NRM professional and two farmers, and two 'Friends of' members.

The biological diversity value of Buloke Grassy Woodlands was raised by all interviewees. A range of values fit under this category (e.g. habitat, uniqueness, diversity of understorey). The uniqueness, rareness and threatened status of this vegetation was appreciated by most interviewees. They were all concerned with the decline of Bulokes and many described the various attempts that had been made to bring them back:

We found that 50% of the 1996 population of Bulokes was gone. So that was fairly sobering for me and for a lot of other landholders [#7]; and

I think it is an understanding that they are rare and threatened and ancient and unique [#7].

One interviewee valued the Bulokes as a 'keystone species' that play an important role in the ecosystem:

The Buloke is habitat for bats. So with any keystone species there is a whole ecosystem that goes with it. And if they go out of existence then all the dependent organisms will go too. So it is not to be seen as an individual but part of a unique community [#7].

Two field naturalists valued Buloke Grassy Woodlands for their understorey, which they felt was often under-valued:

It's not just the grasses that are there, but all the daisies, blue devils, pussy tails and things like that, which probably most people don't see. But how do you put a value on something like that? [#5]; and

The trees can always be replaced, but you can't replace the understorey [#5].

Buloke Grassy Woodlands were highly valued for recreational nature study. Both field naturalists and farmers spoke of the enjoyment in looking for Buloke mistletoe and valuable understorey species:

I used to go out looking for the buloke mistletoe which is a very interesting thing with lovely red flowers [#1].

This vegetation asset was also valued for learning, knowledge generation and scientific observation. Farmers especially like to watch the Bulokes, to notice male and female specimens and any re-generation. One interviewee was fascinated by their history:

Actually I'm intrigued by the early vegetation. I'm curious to know what the other companion species of buloke would have been, because what we've got is a remnant where they have largely been left on their own [#7].

The economic value or use of Buloke Grassy Woodland has changed over the years. Bulokes were once highly valued for their high-quality, straight timber. The use of Buloke timber as roof shingles has contributed to their decline.

Buloke Grassy Woodland has also had value as stock camps/shelter, such as reflected in this quote:

The sheep used to camp under them years ago but now they prefer the red gums, maybe it's because the mob size is bigger [#9].

The native grasslands associated with the Bulokes also have economic value. Although grasslands have largely been cleared for cropping and improved pasture, these areas are highly valued in rocky, unproductive areas and during times of feed shortages:

As soon as we get rain in the summer we get feed off it. It keeps the stock going, the sheep do quite well on it. This year it has been grazed too much I think [#1].

The tension between the need to make a living and preserving native grasslands was discussed:

As far as cropping goes, native grasses don't have much of a role. It just gets eliminated, we have to make a living [#1].

A number of statements were made by a variety of people (farmers, urban and NRM professionals) that could be described as reflecting existence value. The quote that protecting Bulokes is 'just the best thing to do' is an example of existence value. The following quote also suggests existence value:

It's just the fact that they are remnants and we thought, aw, we should try and keep them, they are a land mark. You say 'just east of the Bulokes' or 'down near the Bulokes' [#9].

Bulokes have a strong aesthetic value, both in their appearance and sound. Some people don't consider them as a thing of beauty and say that you have to grow up around them to appreciate them. One interviewee described their sound:

It's the noise they make when the wind is blowing. I find it quite spooky. I wouldn't like to live amongst them but I realise they have their place in our environment [#1];

Landholders particularly relate to the sound of Bulokes. They have an eerie presence and are just a fascinating tree [#7].

Table 6 provides a summary of the range of descriptions that interviewees used to describe the value of Buloke Grassy Woodland. These descriptions are categorised into assigned value-types.

Table 6**Values assigned to Buloke Grassy Woodlands by participants (n=7)**

Assigned value (interviewee terms)	Assigned value type (technical terms)	Respondent description
'Diverse plants', 'biodiversity', 'attract native animals', 'unique plants', 'bird habitat', 'valuable roadsides', 'rare plants', 'threatened trees', 'corridor value', 'keystone species'.	Biological diversity value (habitat value, uniqueness value, diversity value).	All interviewees mentioned these values.
'Looking for mistletoe', 'pleasure in growing seed', 'watching the trees', 'bringing the birds back', 'doing conservation'.	Recreation value (nature study, conservation activities).	1 farmer, 1 urban resident, 1 'Friends of' member.
'Assessing what's happening', 'looking for', 'I'm intrigued by', 'need for research', 'studying remnants'.	Learning value (scientific observation / measurement, knowledge value).	1 farmer, 1 urban resident, 1 rural centre resident, 1 'Friends of' member, 1 NRM professional.
'Landmark trees', 'historical aspects', 'intrigued by early vegetation', 'European use of bulokes'.	Historical value (of bulokes)	1 NRM professional, 2 farmers, 1 urban resident.
'Sheep shelter', 'sheep camp', 'grazing', 'cleared for cropping', 'good feed in summer', 'good grazing'.	Economic value (of native grassland and bulokes)	2 farmers
'Has a place in our environment', 'not many left', 'best thing to do', 'ancient and unique'.	Existence value (of bulokes)	2 farmers, 1 urban resident, 1 NRM professional.
'Sound eerie', 'thing of beauty', 'lovely trees', 'strange trees', 'intimidating trees'.	Aesthetic value (of bulokes)	1 urban and 1 rural residents, 2 farmers, 1 NRM professional, 1 'Friends of' member.
'Whole ecosystem value', 'restore balance'.	Life sustaining value	1 urban resident, 1 NRM professional.

A number of observations can be drawn regarding the responses of the different community-types. Economic value was only mentioned by farmers who used Buloke Grassy Woodland vegetation for stock feed and shelter. Existence value was important to both farmers and NRM professionals. Aesthetic and learning values were important across community types. 'Friends of' members valued Buloke Grassy Woodland for recreation (nature study), learning, biological diversity and aesthetic reasons. There seemed to be no differences in assigned values for Bulokes between males and females. The 'learning' values of Buloke Grassy Woodland seemed to be important for Landcare members.

The previous sections have demonstrated that people assign a wide range of values to the Moolort wetlands, Loddon River and Buloke Grassy Woodland. It is also valuable to explore the range of factors that might have influenced the formation of such assigned values. Held values are one such variable.

4.2 Variables shaping assigned values

4.2.1 Held values

Held values are one of the factors/variables that are likely to have an influence on assigned value formation. The held values of the 17 interviewees in the Moolort study were extracted through coding and analysis of the transcripts. The VBN classification (Stern et al. 1993) was used to describe these values in terms of being egoistic, altruistic or biospheric.

Respondents for the different assets displayed a range of dominant, and secondary, held value orientations. Held values were interpreted from the interviewee transcripts by reading through the dialogue and deciphering if the statements were egoistic ('all about me and my livelihood, my family etc'), altruistic (statements largely reflecting a concern for other people in the community, or further away); and biospheric (statements reflecting direct concern for plants, animals, habitats etc).

In this study, picking out egoistic held value-types was challenging because they often occurred with other held values (social-altruistic and biospheric). Often there would be a tension between these values. In this quote, the respondent has a biospheric value (the health of the river systems) and egoistic ('our own well-being, our agriculture'):

It [the river] really does need looking after, the health of the Murray and Goulburn systems depends on the health of these upper systems. It's incredibly important in the whole scheme of things as well as important to our own well-being, our agriculture [#14].

A number of farmers described the tension between the desire to preserve Buloke Grassy Woodland and the over-riding factor of on-farm economics, suggesting an underlying trade-off between biospheric and egoistic values:

Our Landcare group were very fired up about the Bulokes and for several years we tried to get them to grow; however,

The prices for cropping land was such that some of the members [Landcare] were in fact removing Bulokes and Sheoaks [#7].

Some farmers were mainly driven by egoistic concerns. When asked about native grasses, a Moolort farmer replied;

As far as cropping goes it [native grassland] doesn't have much of a role, it just gets eliminated and we have to make a living [#1].

Another farmer, when asked about his motivation for environmental works to fix erosion gullies on the Moolort Plains, replied:

We've got big plans for our land. We need to completely demolish the erosion tunnels with a backhoe so that we can crop it [#9].

A number of interviewees for the river and wetland assets had social-altruistic values (n=6). This was reflected through their concern for other people in their local community as well as downstream communities. For example, the Loddon River was recognised as an asset for all people:

You might be entitled to live on it [the river] but you don't actually own it, you can't be crabby about natural assets, it's got to be shared [#15]; and

What you are doing is going to affect people downstream [#13].

Other social-altruistic values were simply revealed in general statements that came out when interviewees described their motivations for environmental concern:

I love my community, it's not like I'm some sort of recluse living in the bush...I want to nurture my community [#14].

Of those people interviewed about the vegetation asset (n=7), five had largely biospheric held values. This was then reflected in the values they assigned to Buloke Grassy Woodland. Common assigned values were biological diversity (habitat, uniqueness), learning and aesthetic value. With a biospheric held value-type, individuals seem to put their concern for the environment before everything else. Often, environmental preservation was their highest priority:

There are still some very nice and pretty high-value 'index of stream condition' spots further upstream. It would be nice to preserve those if we could [#12]; and

A grant is helping us put in all the rich woodland herbage that should be on these river flats [#8]; also

I'm more interested in trying to bring the birds and animals back and making conditions good for them [#1].

There was also a sense that environmental preservation was the 'best thing to' and that actions in one place could really make a difference:

We had good habitat for birds, there are threatened species like the diamond tail finch. So those things made it [the river frontage] worthwhile preserving. I know it's just one little speck on the planet, but if you get 20 people who are connected in an area, it will build up [#8].

When a Moolort Plains farmer was asked about what motivated her to protect an area of native grass on her farm, she replied:

I just thought it was the best thing to do...I thought it was best to keep what had naturally been there for thousands of years [#1].

Table 7 provides a summary of value-types across assets and community types. It is important to remember that held values are not revealed in relation to a specific asset. Rather they tell us more about the basic values of the person themselves. Table 7 shows those interviewed in relation to the river and wetlands had a range of held values across the egoistic, altruistic and biospheric spectrum. Those interviewed about the river were predominately biospheric and social-altruistic. The egoistic value seemed to be secondary for these people. Those interviewed about the Bulokes seemed to be more biospheric. The held values of individuals are formed by socialization processes and other variables, not in the context of a specific decision-making exercise or situation.

Table 7

Interviewees and dominant held value-types reflected in interviews

	1. Place-based		2. Practice-based		3. Identity-based ('Friends of')
	Urban	Rural centre	NRM professionals	Farmers	
River interviewees	#14 Biospheric and social-altruistic NLC, M, PR, ST	#17 Egoistic LC, F, ABS, ST #8 Biospheric dominant, also egoistic NLC, F, ABS, ST, SF	#13 Social-altruistic dominant, slightly biospheric LC, M, PR, LT	#15 Social-altruistic dominant, slightly egoistic NLC, F, PR, ST	#12 Biospheric NLC, M, PR, ST
Wetland interviewees	#2 Social-altruistic and biospheric LC, M, PR, LT	*#10 Biospheric LC, M, PR, LT, SF #16 Egoistic dominant, some biospheric LC, F, PR, LT, SF	#4 Social-altruistic NLC, F, PR, LT	*#1 Biospheric and egoistic LC, F, PR, LT *#3 Social-altruistic dominant, some egoistic LC, F, PR, LT	#11 Biospheric NLC, M, PR, LT
Vegetation interviewees	#7 Biospheric NLC, M, PR, LT	*#10 Biospheric LC, M, PR, LT, SF	#9 Egoistic NLC, M, PR, LT, SF	*#1 Biospheric and egoistic LC, F, PR, LT *#3 Social-altruistic dominant, some egoistic LC, F, PR, LT	#5 Biospheric NLC, M, PR, LT #6 Biospheric NLC, F, PR, LT

All of the 'Friends of' members had biospheric value-types reflected in their interviews. As would be expected, social-altruistic values were dominant for the NRM professionals who were focused on helping the community in NRM and agriculture. One interviewee was an exception. This person was also a farmer and seemed to respond from this perspective.

Farmers (n=4) all had elements of egoistic held values though this orientation was secondary to social-altruistic or biospheric values. This was an interesting finding given that farmers are perceived to be motivated by strong production values. For example, many farmers interviewed discussed their desire to help Bulokes to re-generate and spoke about the enjoyment of being near the wetlands when they were full of water and birdlife. Secondary to this discussion was the farmers' need to sometimes let stock graze wetland areas and the usefulness of native grasslands for summer feed.

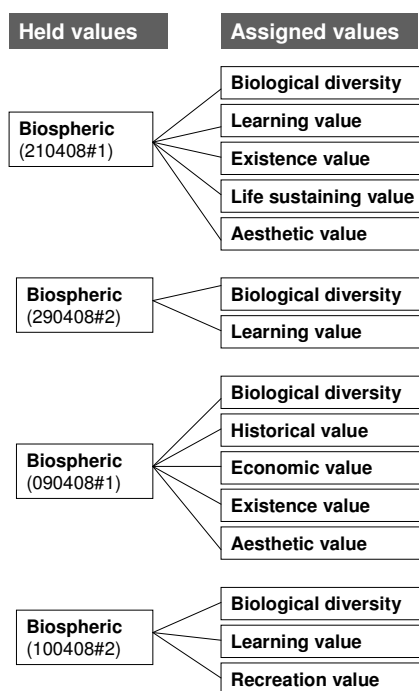
Urban residents did not seem to have egoistic values regarding the environment, instead they had largely biospheric or social-altruistic orientations. The fact that urban residents didn't utilize these assets to make a living may explain the lack of egoistic values. Also, the recreational use of wetlands and remnant vegetation was fairly low. Residents of rural centres had largely biospheric values, with also an element of egoistic (relevant to absentees). For example, the river asset was associated with satisfying a number of egoistic-type values such as recreation, aesthetic and therapeutic values.

4.3 Links between held and assigned values

The interview transcripts for the three assets in this study showed that individuals who had the same held values relating to the environment, could have very different assigned values for a particular asset. For example, Figure 3 illustrates the extent that assigned values varied across interviewees with the same held value (biospheric) for the buloke woodland asset class. Nevertheless, each of these interviewees assigned elements of biological diversity value to the asset. This finding suggests that factors other than held values are influencing assigned values.

Figure 3

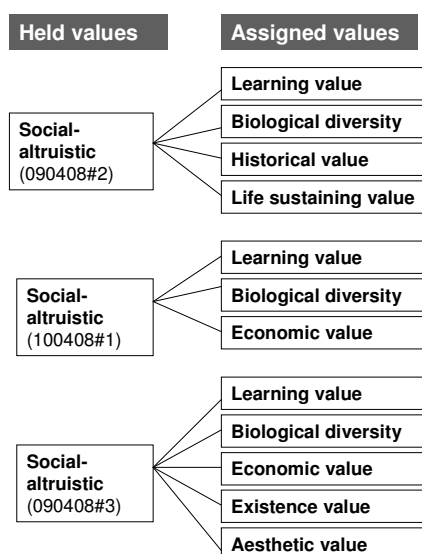
Assigned values for Buloke Grassy Woodlands from interviewees with common biospheric held values



A similar conclusion is illustrated in Figure 4 using social-altruistic held-value responses of those interviewed about the wetland asset [Figure 4]. In this case, the assigned values of learning and biological diversity were common, but a range of other values were also evident.

Figure 4

Assigned values for the Moolort wetlands from interviewees with common social-altruistic held values



4.4 Additional variables shaping assigned values

A number of social and demographic factors were used to further stratify the interviewees. We aimed to achieve a spread of interviewees by gender, residency status (permanent and absentee residents, short-term and long-term residence), property size and members and non-members of Landcare. The following sections discuss these influences.

4.4.1 Socialisation processes

A variety of socialisation processes were mentioned by interviewees when they were asked if they had an interest in the environment, and if so, where that interest came from. Additional insights were obtained from other statements made during interviews.

Family upbringing and family life would seem to be a major factor shaping the values that people assigned to the three assets. Interestingly, the assigned value responses of those who discussed the role of family life in influencing their environmental interest, were largely in the categories of knowledge, life-sustaining value, biological diversity, aesthetic and future value.

The influence of parents, grandparents and other relatives was clearly important. Many informants mentioned that their parents had instilled a love or respect for the natural world. Interviewees shared stories about their childhood memories of interacting with nature through playing, camping, bushwalking and bird watching. Growing up near or in the bush, or in wild natural places was also a strong influence. The following quote was from an interviewee who assigned recreation (nature study), aesthetic and biological diversity values to the Buloke woodland:

We lived on the edge of the bush and my aunt, who raised me, would take me for walks and show me all the different things. So my interest just grew and grew and all I wanted to do was protect things rather than worry about their scientific names [#11]; and

Another interviewee described the role of his family in exposing him to natural places early in life. This interview focused on Buloke Grassy Woodlands which this person valued mainly for aesthetic and biological diversity (uniqueness) reasons:

I gained an early appreciation of the value of untouched landscapes [#7].

Marriage may be another family-related influence on assigned values. Some interviewees had married into rural areas. One interviewee said that marrying a spouse who was interested in the environment had triggered her own interest. Another interviewee said she had grown up in a large urban centre and that it wasn't until she married a farmer that she began to appreciate the environment.

The interaction with nature through leisure, sports and hobbies was another major influence on interviewee values. Six interviewees attributed their environmental interest to their recreation and hobbies. Of these, four had largely biospheric two social-altruistic held values.

Exposure to environmental studies during early schooling and excursions was another important factor shaping the assigned values of a wetland interviewee. This person valued wetlands for their learning, aesthetic and biological (habitat) value :

We had a teacher who would take us on excursions into the forest and show us the ecological layering and stuff. I later thought I'd learnt that at university until my mother gave me my form 2 science book and I saw it all [#3].

Involvement in Landcare or similar environmental group would seem to be another major influence of the formation of values for the environment. One interviewee had joined Landcare to help fight a controversial planning decision in his local area. Over time he developed a strong interest in rehabilitating the Loddon River. A farmer on the Moolort Plains attended a Landcare breakfast which sparked a strong interest in biodiversity. One interviewee also suggested that farming practices were changing due to what landholders were learning through the Landcare movement. Landcare is also seen as a way for new landholders to receive guidance about land management, often shaping environmental values:

New land owners have come to Landcare groups for guidance. They initially come because they want to plant trees, but through doing that they get an appreciation for the importance of what they've already got [#3].

A strong sense of community was noticeable during the course of the interviewing. This was particularly so for interviewees from the small rural centres of Guildford and Newstead, on the Loddon River. These interviewees said that their communities had a strong identity with the river, therefore valuing it highly. It gave them something to focus their community activities around as reflected in the 'Guildford Green Guitar' event.

One interviewee felt that his interaction with the Indigenous community had shaped the way he felt about the environment. Interestingly, he valued the river mainly for historical (Indigenous and European), recreation and biological diversity reasons:

I got to know a lot of Indigenous people in northern Victoria. I spoke to them about the environment and I think they handed over some 'care of country' principles [#12].

The influence of passionate individuals, environmental 'champions', mentors and community leaders were also mentioned as strong factors in shaping environmental values. One interviewee, who valued the river for biological diversity (habitat) reasons, discussed the influence of a local community member:

X was fantastic. He showed us the big picture and was a real mentor for us. We learned to look after our best asset...he set us off on that train and now we're obsessed with it [#8].

4.4.2 Economic factors

Economic interests quite often have a powerful influence on landholder decisions regarding the environment. As explained, the need to make a living from the land and the tension between agriculture and environmental protection were strong themes emerging from the farmer interviews.

The availability of off-farm income may also be an important factor influencing assigned values but off-farm income was only mentioned by one interviewee. This area was not explored in any of the interviews directly. One of the interviewees for the river asset described the extensive work that they had undertaken on the river frontage. She had attributed the ability to do this because *we still earn an income from the city* [#8].

4.4.3 Gender

Males were more likely to have biospheric orientation while females were more likely to have egoistic orientations. There were no apparent trends in assigned values by gender for the wetlands and vegetation assets. For the river asset, the females were more likely to assign community, therapeutic and aesthetic values whereas males were more likely to assign biological, economic and existence values.

4.4.4 Occupation

In this study, occupation was only investigated in terms of three categories: farmers, non-farmers and NRM professionals. Table 8 compares the assigned values for wetlands between farmers and non-farmers. Compared with non-farmers, farmers reported a wide range of assigned values for wetlands. Although both groups valued wetlands for biological diversity and learning uses, farmers also valued wetlands for their economic, aesthetic and existence values.

Table 8

Comparison of values assigned to the Moolort wetlands by farmers and non-farmers

	Biological diversity	Life sustaining	Learning	Recreation	Economic	Aesthetic	Historical	Existence
Farmers with wetlands								
#3	✓		✓		✓	✓		✓
#10	✓	✓	✓		✓			
#16	✓				✓			
#1	✓			✓	✓	✓		✓
Non-farmers								
#4	✓		✓					
#5	✓	✓	✓				✓	
#11	✓		✓	✓				

4.4.5 Level of interaction with government departments

Eight of the interviewees had past or current dealings with the local North Central Catchment Management Authority (NCCMA) through involvement in monitoring programs, incentive and tender programs and membership of CMA committees. Whether this interaction had led to the formation of particular assigned values for the three assets is uncertain.

It is likely that the motivation to participate in CMA programs may be driven by other variables such as held values, socialization processes and economic reasons (in the case for accessing incentives). Indeed, a number of the values assigned to the three assets are shared by the majority of those interviewed who said they had been involved in a CMA program. For example, all three assets were valued highly for biological diversity (habitat and uniqueness) reasons by all eight respondents involved in CMA programs. As might be expected, all eight interviewees spoke of their desire to restore the environment.

Of the eight interviewees who mentioned being involved in CMA programs or monitoring activities, five had a biospheric value-type and three were social altruistic. This would suggest that they are driven mainly for the concern for other people and the environment rather than their own egoistic concerns.

4.4.6 Location of respondents in relation to the assets

The proximity of residency in relation to the asset would seem to be another factor influencing the values individual in this study assigned to the different assets. Of the 17 interviewees, seven had one of the natural assets located on their property. This group included three commercial farmers with Buloke Grassy Woodland and/or swamps on their property, an NRM professional (who was also a farmer with Buloke Grassy Woodland), two rural centre residents with river frontages and a small farmer (classified as 'rural centre') with a river frontage. For the farmers who were directly managing the asset in question, there was a wide range of assigned values but economic value was important for all. For the small farmer and rural centre residents the therapeutic value was important (i.e. the lifestyle that being near the river provided).

Closely related to proximity to the assets was general community awareness of the asset. Awareness of Buloke Grassy Woodlands was thought to be limited to those who live with them on their properties or field naturalists. Even though it was felt that the community was becoming more environmentally aware, most interviewees felt they would not necessarily know about Bulokes. It was suggested that perhaps more people would be aware of the swamps due to the fact that they are visible from the Pyrenees Highway (which dissects the Moolort Plains):

People drive along and they can see them, so they would note the changes as they go along. And they certainly note when a farmer might cut a piece out of the swamp for a centre pivot or something [#3]; and

The environment around here is a pretty subtle landscape to interpret, unless you've been introduced to it through some awareness activity. Most wouldn't know that they are quite important swamps [#10].

The wetlands and vegetation asset largely occur on private land. The land tenure of the asset was suggested as an important factor in community awareness:

We really don't know much about the Moolort Plains apart from the roadsides because the rest is largely private property. We don't go on private property unless we are invited [#5].

Community awareness for the Loddon River was thought to be very high because public access was possible in many areas. The small centres of Guildford and Newstead felt a strong connection with the river as a community asset and a place for recreation.

5. Discussion

5.1 Assigned values for three natural assets across different NRM community-types

A wide range of values was assigned to the river, wetlands and vegetation assets in the Moolort study. The Loddon River had the widest range of assigned values (ten categories) compared to Buloke Grassy Woodland and the Moolort wetlands (eight categories each). Of the set of 11 assigned values, seven were shared by all three assets: life sustaining, recreation, aesthetic, biological diversity, economic, existence and historical values. The river was not valued for learning but had its own additional categories of community, therapeutic and future value. The shared values had their own sub-set of values specific to each asset and hence would require different item statements in a written survey addressing specific assets. For example, recreation values differed for each asset. For the river, the recreation values were swimming,

fishing and camping. The recreational values for the wetlands were bird watching and nature study; and the recreational value of Buloke Grassy Woodland was mainly nature study.

The Moolort findings are consistent with the results from a mail survey exploring assigned values for river frontages along the Goulburn River recently conducted by Curtis et al. (2008). A wide range of assigned values were identified covering an environmental, social and economic values types. No particular cluster of value types was deemed more important than another. In the Moolort study, all community-types valued the life-sustaining and recreation values of the river. This finding may provide a common point of influence for agencies attempting to engage the wider public in NRM.

Buloke Grassy Woodland vegetation was valued by all interviewees for its biological diversity value. In particular, they valued Bulokes for being rare and unique; grasslands and understorey species for their habitat value; and for being a 'keystone species'. Although economic value was seen as important for farmers, they valued the vegetation for other reasons too. A study of landholder values for remnant vegetation in Western Australia (Moore and Renton 2002) also found that rural landholders value remnant vegetation for more than just functional reasons related to agriculture and land management. Ecological value was rated highly among two thirds of our interviewees, and more than one value was commonly assigned to remnant vegetation (ecological, functional, aesthetic and community value).

The most common types of values assigned to wetlands were biological diversity, recreation (nature study), learning and life sustaining values. The role of the wetlands in the greater ecosystem and for bird migration was noted by the majority of interviewees. The wetland asset seemed to be the subject of the most tension between agriculture and the environment. Farmers struggled between the desire to protect the wetlands on their property and their need to open up more grazing and cropping land due to economic pressures they faced because of drought.

The low incidence of existence value may suggest that either the interview schedule did not allow for the exploration of existence value, or that it is difficult for participants to describe this value. Existence value was raised most often relating to the vegetation asset; and mainly by farmers and NRM professionals. There seemed to be a fascination and great respect for Bulokes among these groups and sadness at not being able to get them to regenerate. Existence value is closely related to intrinsic value, or valuing the idea that nature has value for its own sake. Interviewees were not prompted about such values in the interviews. These values rarely came up in regard to the three assets. This may be because such a concept is hard to understand and more difficult to express than the other types of values around direct uses of the assets. Winter and Lockwood (2004) found this to be the case in their exploration of intrinsic value-types.

5.2 Variables shaping assigned values: held values and other influencing factors

The literature suggests that assigned values are influenced by a range of factors. Tarrant and Cordell (2002) called these 'mediating factors' or population variables.

Held values are one of a number of factors likely to influence the formation of interviewee assigned values for the three natural assets included in this study of the Moolort Plains. In this study we also attempted to explore held values. Those interviewed for the river and wetland assets seemed to display a mixture of egoistic, social-altruistic and biospheric orientations. However, the interviewees for the vegetation asset mostly had a

biospheric values orientation. Two of these respondents were commercial farmers and the remaining five were either urban or rural centre residents, and as explained below, these characteristics are often associated with a biospheric orientation.

In the Moolort study, urban residents had largely biospheric or social altruistic held values concerning the environment. The egoistic value-type was not evident with our interviewees. It seemed that those living further away from the asset had largely biospheric values. A number of other studies support the view that urban residents are more biospheric/biocentric (McFarlane and Boxall 2000). Other researchers have identified egoistic values in urban residents when they are using natural areas for recreation (Rancevskis and Lupi 2006).

The influence of gender on environmental values has been widely explored in the literature. A surprising observation in the Moolort study was that males were more likely to have a biospheric orientation while females were more likely to have an egoistic orientation. A number of studies have found that females are more likely to have a biospheric orientation (Vaske et al. 2001; Steel et al. 1994; McFarlane and Boxall 2000). Steel et al. (1994) hypothesised that women seek to resolve dilemmas, such as the environment, with an ethic of care and have a protective attitude towards nature. Dougherty et al. (2003) found that women tend to base their attitudes more on underlying beliefs and values than men do. Others have found no gender differences in the strengths of some value orientations (Stern et al. 1993).

Steel et al. (1994) found that those with biocentric values towards forests were more likely to be members of environmental organizations. The Moolort study findings are consistent with this finding in that all of the members of 'Friends of' groups had biospheric held values. However, there seemed to be no apparent relationship between Landcare membership and held values. This finding is consistent with Curtis and DeLacy (1998) who found no significant differences between Landcare participants and non-participants on a stewardship ethic.

The Moolort study suggests that early socialization processes that involve exposure to natural places have an influence on both held and assigned value formation. Interviewees who mentioned family as an important influence on them developing an interest in the environmental valued natural places for knowledge, life sustaining, biological diversity, aesthetic and future values. Those interacting with nature through their hobbies and recreation had biospheric and social-altruistic orientations, not egoistic held values. This finding is consistent with those of Schultz (2001, p.336) that different levels of environmental concern are based on the 'degree to which an individual perceives an interconnection between self and nature'. Shindler (2000) felt that people's judgments about environmental issues are more likely to be formed or influenced through their interactions or personal relationships with the landscape.

Important people or environmental 'champions' were identified by a couple of interviewees as an influence on their environmental motivation. This finding suggests there are points of influence within communities, or a few key people who are likely to be able to increase the adoption of sustainable practices.

Knowledge and information is another factor that can influence environmental values. For example, a mail survey of river frontage landholders (Curtis and Robertson 2003) reported that higher adoption of CRPs for riparian areas was found to be positively correlated with greater knowledge of river function. In the Moolort study the interviewees who directly managed one of the assets on their property, or who were a field naturalist or NRM practitioner were more likely to have sound biophysical knowledge about the

asset in question. Therefore it was difficult to identify if this was a factor in assigned value formation. A much wider sample would be necessary.

Location or distance of residence from the asset in question may be important factors in assigned value formation. Brown et al. (2002) used a place-based approach to investigate landscape values of a community in Alaska. Interviewees were asked to highlight important natural assets on a map and indicate the values they assigned to these areas. They found the assigned values of assets located nearest to the interviewees were aesthetic, recreation and therapeutic values, where the assets further away had assigned values relating to life support, future and intrinsic value.

Longer term residents (living for more than 10 years in the area) in the Moolort study were more likely than shorter-term residents to have a biospheric orientation. Vaske et al. (2001) explored this hypothesis and found that individuals who had lived in Colorado longer than 11 years were slightly more anthropocentric in their views towards nature (similar to egoistic) than shorter-term residents. In a study of rural property turnover in a Victorian catchment, Mendham and Curtis (2008) found that shorter-term residents (new owners) had higher levels of concern about environmental issues. Other studies have found that newer residents believe the landscape should be preserved while long-term residents are more focused on sustainable land use (McCool and Martin 1994). Layden et al. (2003) investigated public value orientations of the public in the USA about wildlife and land use planning issues. These authors found that those who were least supportive of land zoning were older and longer-term residents with a rural upbringing. Those more supportive of land zoning were mostly short-term residents. In the Moolort study, most of the short-term residents had also moved from the city.

In some cases, interviewees from different community-types that might seem have different value orientations had similar held values. For example, in the context of the vegetation asset, both farmers and 'Friends of' members expressed biospheric held values. Other research has found similarities in the held values of groups that would seem to be very different. For example, a study of farmers and conservationists around irrigation water use in the Barmah Forest found that these groups had similar values concerning planning for future generations (Syme and Nancarrow 1992). A comparison of the values of farmers, environmentalists and the general public for forest and wetlands reported similar findings (Winter 2005). Winter (2005) looked at instrumental and intrinsic values for two forests and wetlands. Winter (2005) found that farmers and environmentalists held similar values and made similar decisions in a scenario exercise. Seligman et al. (1994) looked at the values and ethics of seemingly conflicting stakeholders in relation to water allocation in five Australian catchments. These authors found that the different stakeholder groups agreed on a common set of values about water allocation; namely that water is owned by everyone and should be managed for the public good (Seligman et al. 1994). Indeed, Winter (2005) may have an important point when she says that 'there may be an opportunity for cooperation and communication between these members using their values as a common point' (Winter 2005, p.14).

5.3 Usefulness of value-belief-norm theory for exploring assigned values

VBN theory provided a useful framework for categorizing the held values of each interviewee. VBN theory is designed for use in quantitative studies where a nine item scale is used based on Likert-response options. In this study we have only employed the VBN value orientation.

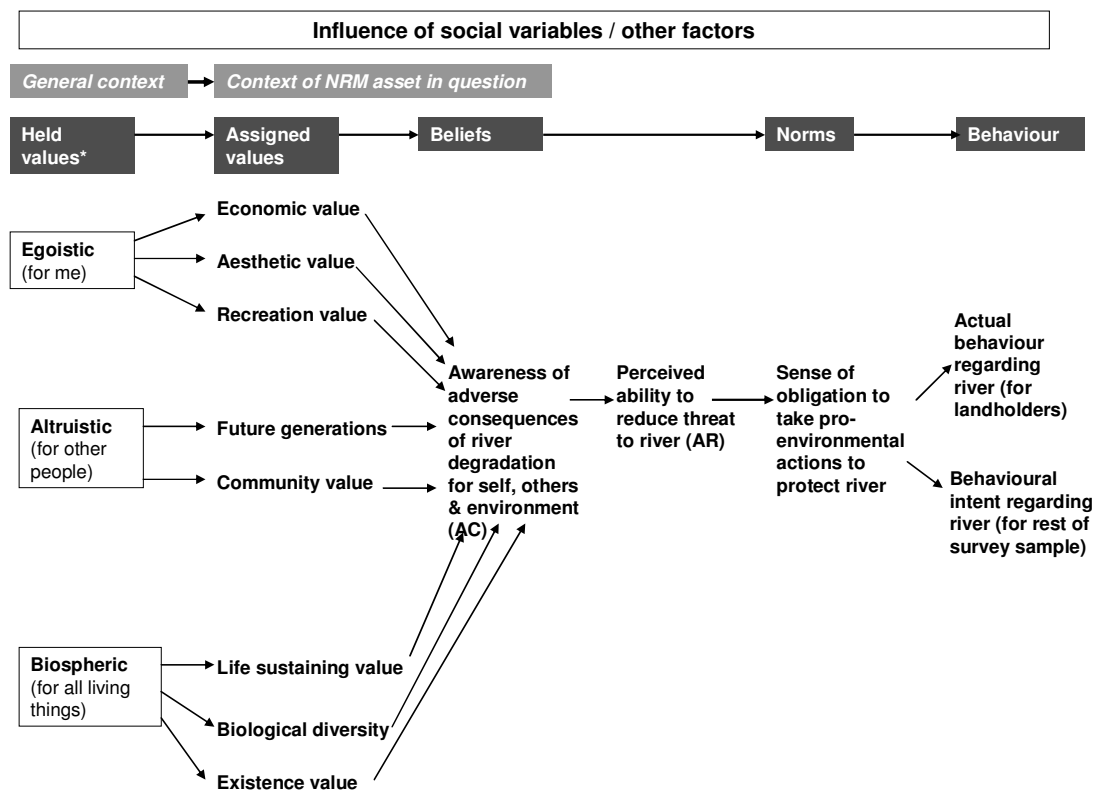
VBN theory suggests that environmental concern can be triggered from any of the three value-types according to perceived environmental consequences for self, others or all

living things. There are mixed responses in the literature about the application of VBN theory. Some authors report that the VBN model is a good predictor of behaviour (Tarrant and Cordell 1997; Joireman 2001). However, whilst the VBN categories may be useful for the next phase of our research, the use of the VBN scale to explore value orientations in a larger quantitative study has some limitations. The scale consists of only three items for each value orientation and it is claimed that this small number of scale items has contributed to low scale reliability (Stern et al. 1993). Others have reported moderate scale reliability but difficulty in separating scale items, particularly the biospheric and social-altruistic value orientations (Snelgar 2006).

VBN does not account for assigned values, nor does it deal with other social factors influencing environmental behaviour. Figure 5 illustrates an adaptation of VBN theory that can be used to explain the link between held and assigned values, beliefs, norms and environmental behaviour. Figure 5 uses an example of values, beliefs, norms and behaviour regarding a river asset. Assigned values relate specifically to the river and can also fit into clusters regarding self, others and biosphere (though these can overlap). If the individual is aware of the consequences of river degradation for any of the things that they assign value to (e.g. economic value of irrigation water) then they are more likely to take action (AC beliefs). How the individual feels about who has responsibility for taking action (e.g. themselves or government) also influences their behaviour (AR beliefs). The individual may feel a sense of moral obligation to protect the river (norms). In this way it should be possible to explore the factors leading to intended or actual behavior.

Figure 5

Adaptation of VBN theory to explore assigned values for a river asset



VCN theory was developed to be used in quantitative studies (i.e. surveys). However, in the Moolort study I have used VCN as qualitative categories (egoistic, altruistic and biospheric values) and attempted to think about assigned values in a VCN theory context. This adapted VCN theory will be tested in a mail survey study of assigned values on the Moolort Plains.

6. Conclusion

This preliminary qualitative study of 17 people across a number of community-types has provided a rich snapshot of the range of assigned values for three natural assets in the Moolort area. Assigned values common for all three assets included life-sustaining value, recreation, aesthetic, biological diversity, economic, existence and historical values. The river had the additional values relating to community, therapeutic and future use value. People who had similar held values regarding the environment, had differing and wide ranging assigned values for particular assets. A mail survey will further explore assigned values and reveal any trends across and within community types.

Although this study was based on interviews with 17 participants only, a number of observations regarding regional NRM decision-making can be noted, including:

- Potentially conflicting groups can have similar value orientations (e.g. farmers and 'Friends of 'members) suggesting that held values can be used as a common point for discussion/communication regarding natural areas.
- It can't be assumed that a particular type of community will share the same held or assigned values. NRM decision-making and communication needs to take a very broad view of the many different values and uses that the community has for natural areas.
- Farmers are not likely to be entirely egoistic or production-focused. In this study their biospheric values were dominant. For example, although farmers want to preserve their natural assets, economic reasons may motivate farmers to put such areas into production.
- The wide range of values assigned to natural assets by different community types illustrates the broad range of interests that community stakeholders are likely to have for natural areas. This would suggest that CMAs need to include a wider range of stakeholders in regional NRM decision-making than having predominantly farmer membership on Boards and committees.
- Rapidly changing demographics (particularly around Castlemaine, Guildford, Newstead) is seeing an influx of people from larger urban centres. Many of these new settlers are likely to have biospheric values, or egoistic regarding their own right to utilize such areas for recreation. These values can be quite different to longer-term residents and this diversity of values can complicate NRM planning.

The findings of this preliminary study will be used as a basis for development of a mail survey that aims to:

1. Describe the range of assigned values for three natural assets across and within three NRM community-types on the Moolort Plains.
2. Explore the factors that influence formation of assigned values (and the relationships with community-types and asset-types).

Statistical analyses will be undertaken to explore relationships between dependent variables (assigned values) and independent variables. Analysis of the Moolort interviews confirms that some of the independent factors to be included in the survey are held values, socialization factors, gender, residency status, occupation, environmental group membership and length of residence in the area.

VBN theory will underpin survey development. Adopting VBN theory means that measures for held and assigned values, beliefs, norms and behaviour need to be included in the survey. Additional literature will be reviewed to identify items used by other researchers to explore the different elements of the VBN framework.

The interviewees in this study were asked to think about the three assets retrospectively (past and current values). The impact of drought has affected the condition and use of the river and wetland assets in the Moolort areas. For the mail survey, respondents will need to be prompted to think about their past values for these assets when the river level was higher and the wetlands were wet.

Awareness of assets is likely to differ depending on the extent of personal connection and distance from the asset. For example, a number of Moolort interviewees said that people in larger urban centres in their region (Maryborough and Castlemaine) are unlikely to be aware that the Moolort wetlands even exist. The same could be said for the buloke woodland. To ensure that survey data is reliable (individuals have some knowledge of the asset) and to achieve a high response rate survey recipients need to be carefully selected. For example, it seems that the people from a wide area and cross-section of society are familiar with the river, but this is not the case with the wetlands or vegetation assets.

In the mail survey, the same break-down of community-types will be utilized. This preliminary research suggests that these categories of community-types are useful categories for differentiating sectors of NRM stakeholders in the community. However, not all community-types are likely to respond to questions relating to all three of the assets. For example, the urban community in Castlemaine is not likely to be very aware of the Moolort wetlands. Similarly, the Loddon River won't have relevance for the urban community in Maryborough. Given these asset awareness problems, sub-samples of each community type will not be expected to answer questions about certain assets.

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