

# Forest Value Orientations in Australia: An Application of Computer Content Analysis

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Received: 3 December 2006 / Accepted: 21 June 2007 / Published online: 5 September 2007  
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**Abstract** This article explores the expression of three forest value orientations that emerged from an analysis of Australian news media discourse about the management of Australian native forests from August 1, 1997 through December 31, 2004. Computer-coded content analysis was used to measure and track the relative importance of commodity, ecological and moral/spiritual/aesthetic forest value orientations. The number of expressions of these forest value orientations followed major events in forest management and policy, with peaks corresponding to finalization of Regional Forest Agreements and conflicts over forest management. Over the time period analyzed, the relative share of commodity value orientation decreased and the shares of the ecological and moral/spiritual/aesthetic value orientations increased. The shifts in forest value orientations highlight the need for native forests to be managed for multiple values and the need for continued monitoring of forest values.

**Keywords** Forest value orientations · Australia · Computer content analysis

Over the decades since the 1970s there has been considerable conflict and controversy concerning the management of Australia's native forest estate. This conflict has arisen from growing community demands that native forests be managed for a range of often conflicting values, including conservation and amenity values, whereas resource-dependent communities and industries seek to secure rights and continued access to native forests for the production of timber and woodchips (Dargavel 1995; Mercer 1991). The conflict has taken place in a range of settings and at a range of scales, from direct conflict between demonstrating conservationists and forestry workers in particular logging coupes (an area of forest designated for timber harvest), to constitutional disputes over management rights and responsibilities between State and Australian governments in the High Court of Australia (RAC 1992). These conflicts often arise as a result of competing forest values and the attempts by various groups to alter forest management in order to be consistent with their value orientations. In an effort to reduce the level of conflict, particularly between State and Australian governments, the National Forest Policy Statement (NFPS) was developed and signed by the Prime Minister of Australia and the Premiers and Chief Ministers of the States and Territories in 1992 (Tasmania signed the NFPS in 1995). Under the NFPS, Regional Forest Agreements (RFAs) have been negotiated that seek to meet the joint objectives of forest conservation and sustainable production forestry (Commonwealth of Australia 1995).

In this article we explore forest value orientations expressed in the public news media discussion of native

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forest management in Australia. Computer-coded content analysis was used to identify and track expressions of three forest value orientations: commodity, ecological, and moral/spiritual/aesthetics. Because this data source and methodology are likely to be unfamiliar to many readers, the following paragraph provides a brief rationale for this approach.

The news media play a dual role in public debates about issues such as forest policy and management, serving both as a direct forum for public discourse (through editorials, letters to the editor, etc.) and reporting on discussion occurring in other forums such as public meetings and hearings, legislatures, the courts, demonstrations, and protests. Analysis of the content of the news media thus allows us to take the pulse of ongoing public debate about social issues and to track change in the debate over time. Empirical research by communications and public opinion researchers has conclusively shown that the news media both shape and reflect public opinion for a wide range of issues (Fan 1988; McCombs 2004). For example, Elliott and others (1995) found a significant impact of changes in media coverage on public support for environmental protection. Page and others (1987) found that the content of network television news accounted for a high proportion of aggregate changes (from one survey to another) in US citizens' policy preferences. Analysis of the content of the news media has repeatedly been shown to produce results that parallel the findings of attitude surveys for many public policy issues (e.g., Fan 1997; Fan and Holway 1994; Gamson and Modigliani 1989; Salwen 1988; Shah and others 2002), including environmental and natural resource issues (e.g., Bengston and others 2001; Kepplinger and Roth 1979; Liebler and Bendix 1996; Williams 2000). Related studies have found that the news media strongly influence agenda-setting for public policy issues (Dearing and others 1996; McCombs 2004); that is, there is a relationship between the relative emphasis given by the media to issues and the degree of salience these topics have for the general public. Therefore, analysis of the public debate about social issues contained in the news media is not mere "media analysis"; it is a window into the broader social debate and a means to gauge, indirectly, public attitudes and values.

The following section briefly reviews recent forest policy developments in Australia and the nature of conflict surrounding forest management. This is followed by a review of values and value orientations in the context of forests. The next section discusses the methodology we used to measure expressions of the three value orientations, followed by a presentation of findings and discussion of the implications.

## Forest Management in Australia

Australian forests are dominated by hardwood species of the *Eucalyptus* genera that are concentrated in the four eastern states of Tasmania, Victoria, New South Wales, and Queensland, with additional commercially important forests in southwest Western Australia (Slee 2001). Following Federation in 1901, the State governments retained responsibility for the management of forests, with the bulk of the forest estate remaining in public ownership. About 24% of Australia's forests are privately owned, with the remainder under various forms of public tenure (BRS 2005). The State governments have responsibility for the development of forest policy, control and management of public forests, regulation of forest activities on private lands, and protection of the environment (Bartlett 1999). The Australian government has responsibilities for particular aspects of forest management under specific heads of power in the Australian constitution, including international obligations and the export of forest products.

In the early decades of the 20th century, Australian foresters working for the state forest agencies adopted the European model of softwood plantations to meet the nation's demand for wood in the future (Carron 1985). Softwood timber was preferred by builders over Australia's native hardwood forests, which were dominated by unfamiliar *Eucalyptus*. The lack of a market for low-grade logs from the native forests was a long-standing frustration to Australian foresters. This situation changed in the 1970s with the combination of the availability of technology for eucalypt pulping and the high demand of Japan's pulp and paper industry. As a result, management of native forests incorporated intensive woodchip production, and native forest hardwood chip exports soared (Clark 2004). By the mid-1970s, five large woodchip mills, three in Tasmania and one each in Western Australia and New South Wales, were exporting woodchips to Japan (Dargavel 1995).

Public disquiet about the management and use of native forests grew during the 1970s. In 1973, the seminal book *The Fight for the Forests: The Takeover of Australian Forests for Pines, Wood Chips and Intensive Forestry* (Routley and Routley 1973) was published. This controversial book critiqued the form of forestry dominating Australia and presented an alternative forestry paradigm based on multiple values (Dargavel 2003). The exercise of competing values over the forest domain saw the first forest blockade commence in 1979 at Terrania Creek in New South Wales, where conservationists sought to prevent the construction of a road required to access timber for logging (Dargavel 1995). Throughout the 1980s, protests and blockades by conservationists seeking to increase the area of native forest that was protected intensified. Key sites of forest conflict were among rainforest and old-growth forest

of the eastern seaboard of mainland Australia and in Tasmania. Increasingly, forest workers and forest-dependent communities became vocal in forest debates, highlighting their vulnerability to changes in access to forest resources and the disproportionate economic impacts they would have to bear if access were constrained. The forest industry and their supporters began to adopt the direct action approaches that had been used so effectively by conservationists in highlighting their concerns.

Amid this background of seemingly irreconcilable forest conflict, the Australian and State Governments negotiated a new policy statement on forestry. The NFPS was signed in 1992 (with Tasmania signing in 1995) and sought dual objectives of maintaining and conserving a forest estate for future generations while developing an internationally competitive and ecologically sound forest products industry (Commonwealth of Australia 1995; Lane 1999). Through the NFPS, the States and Australian government were committed to the development of RFAs to provide long-term security for both conservation and development values. RFAs were given impetus when, in December 1994, the then Prime Minister announced a phase out, by 1 January 2000, of the export of woodchips from native forests that were not covered by an RFA or where significant progress toward an RFA had not been made (Mobbs 2003). The Australian government's control over export licenses would be removed once conservation could be deemed secure under an RFA.

Comprehensive regional assessments (CRAs) were carried out in forest regions as a basis for the Australian government and the States negotiating a RFA. The CRA

involved two types of assessment. The first was an assessment of forest regions in terms of their environmental, biodiversity, cultural heritage, wilderness, old-growth, and World Heritage values. The second type of assessment was concerned with the social and economic values of commercial and noncommercial uses of forest in a region. The CRA was to provide a synthesis of relevant information upon which the development of different land allocation, forest management and industry, and community development options could be developed. Conservation objectives in the NFPS were implemented through a range of measures, but principally through the development of a "comprehensive, adequate, and representative" system of protected forests. In general, this was interpreted as protecting 15% of the pre-1750 distribution of each forest ecosystem in the forest reserve system. Other criteria were established for the protection of wilderness, old-growth forests, and rare and endangered species and ecosystems (Commonwealth of Australia 1995; JANIS 1997). CRAs have been carried out for 11 regions, with RFAs being negotiated and signed between the Australian and State governments in 10 regions (Table 1).

The history of native forest management in Australia presents a consistent theme of conflict over competing values and uses for native forests. The RFA process has attempted to reconcile these competing uses through an assessment and planning process that sought to balance the range of use objectives. At the heart of these conflicts are different values held by individuals leading to conflicting preferences for the use and management of native forests.

**Table 1** Regional forest agreements

Region	State	Approximate date CRA <sup>a</sup> finished	Date RFA <sup>b</sup> signed
East Gippsland	Victoria	July 1996	Feb. 1997
Tasmania <sup>c</sup>	Tasmania	July 1997	Nov. 1997
Central Highlands	Victoria	June 1997	Mar. 1998
South West Western Australia	Western Australia	Feb. 1998	May 1999
North East Victoria	Victoria	August 1998	Aug. 1999
Eden	New South Wales	July 1998	Aug. 1999
West Victoria	Victoria	July–Oct. r 1999	Mar. 2000
Gippsland	Victoria	Sept. 1999	Mar. 2000
North East New South Wales <sup>d</sup>	New South Wales		Mar. 2000
Southern New South Wales	New South Wales	Apr. 2000	Apr. 2001
South East Queensland	Queensland	Mar. 1999	No agreement signed

<sup>a</sup> CRA: Comprehensive regional assessment

<sup>b</sup> RFA: Regional forest agreement

<sup>c</sup> Tasmania RFA was amended in 2001 and 2007, with additional areas added through the Tasmanian Community Forest Agreement in 2005

<sup>d</sup> North East New South Wales comprises both the Upper and Lower North East New South Wales regions

Source: Brooks and others (2001)

## Forest Values and Value Orientations

Values have been an object of study in every social science discipline for many years, with each discipline defining and approaching the concept from a different perspective and shedding light on the nature of human values (Bengston 1994; Brown 1984). In this article we follow Rokeach's (1973) broad definition of held values and define forest values as relatively enduring and fundamental concepts of what is good and desirable about forests and forest ecosystems. For example, aesthetic value is a fundamental and widely held conception of what is good about forests, although people hold a range of distinct concepts of what constitutes beauty in forests (Gobster 1999). Values are used to evaluate the desirability of goals (e.g., sustainability or other goals of forest policy) and behaviors (e.g., clearfelling or other forest management actions). Values are the most deep-rooted and central elements in a person's system of attitudes and beliefs. Individual and social values tend to be relatively stable and resistant to change, although they can shift slowly over time.

A value orientation is defined as "a set of linked propositions embracing both value and existential elements" (Kluckhohn 1951, p. 409). Social scientists working in the environmental arena have conceived of an environmental value orientation as a cluster of interrelated values and basic attitudes and beliefs (e.g., Stern and others 1993; Vaske and others 2001). Fulton et al. (1996, p. 28) noted that environmental value orientations "provide consistency and organization among the broad spectrum of beliefs, attitudes, and behaviors" regarding the environment and natural resources.

Different value orientations are rooted in alternative moral philosophies or theories of "the good." For example, one basis for environmental value orientations is utilitarianism, which views the value of nature as stemming from its utility for achieving human ends. Another philosophical base for environmental value orientations is the Kantian or deontological tradition, which focuses on the rights of nature, our duty to protect it, and the intrinsic value of nature. Other philosophical bases for environmental values include virtue ethics (Sandler and Cafaro 2005) and moral pluralism (Wenz 1993). See DesJardins (2005) and Light and Rolston (2003) for detailed discussions of these moral philosophies and their relevance for assessing environmental values.

Environmental value orientations have typically been characterized along a bipolar continuum from an anthropocentric or utilitarian orientation to a biocentric orientation (Vaske and others 2001). An anthropocentric/utilitarian value orientation purports that "... providing for human uses and benefits is the primary aim of natural resource allocation and management" (Steel and others

1994, p. 139). The emphasis is on the instrumental importance of the environment for achieving human goals. A biocentric value orientation is a nature-centered perspective that places human uses and values in an ecological context and emphasizes the primacy of goals such as environmental protection, preservation, and maintenance or improvement of ecosystem health and integrity. Leopold's land ethic has often been characterized as biocentric or ecocentric. Some social scientists have distinguished three environmental value orientations (e.g., Hooker 1992; Stern and others 1993) or four value orientations (e.g., Borrie and others 2002; Bright and others 2000).

Australian studies on forest values have also developed three- or four-part categorizations of forest value orientations using the biocentric–utilitarian continuum as the starting point. Winter (2005) and Winter and Lockwood (2004) included intrinsic values and three categories of instrumental values: use (nonrecreational), recreational, and nonuse values. Examples of nonuse values that were instrumental in providing some human benefit included bequest value (benefit provided by a forest's preservation for future generations) and existence value (benefit received by those who derive satisfaction from knowing that a forest is protected) (Winter 2005). Ford and others (2005) developed a three-part categorization of forest values: timber production (use), the environment (nonuse), and aesthetics (nonuse). In surveys for the RFA process in South East Queensland, the three main value orientations delineated were environmental, intrinsic, and extrinsic (timber production) values (EBC 1998).

In this study we examined expressions of three distinct forest value orientations—commodity, ecological, and moral/spiritual/aesthetic—in Australian news media stories about native forest management. To identify these value orientations, the authors repeatedly and carefully read a random sample of several hundred news stories, with each author separately developing an outline of important and recurring themes related to potential forest value orientations and then reconciling differences between the outlines and arriving at the final set of three. The three Australian forest value orientations we observed correspond closely with those identified by Ford and others (2005) and EBC (1998). The following paragraphs briefly describe these value orientations.

First, we found widespread expression of an anthropocentric or utilitarian value orientation that emphasized the importance of human uses and benefits of forests, including benefits to local economies, jobs in timber-dependent communities, employment in outdoor recreation and tourism, commodity-related uses and benefits, and so on. A typical example of the expression of this value orientation from our database of news stories is as follows: "The rally outside state parliament is expected to draw up to 3,000

supporters who believe the government's draft regional forest agreement (RFA) would force mills to close as timber supplies are locked away through logging bans" (AAP 1999). We have used the term "commodity value orientation" for expressions of this value orientation.

Second, we found many expressions of a biocentric forest value orientation that emphasized the importance of protecting the environment and promoting ecological goals. Expressions of this value orientation often involved general discussion of the ecological value of forest ecosystems, discussion of the importance of life-supporting ecological services provided by forests (e.g., carbon sequestration, wildlife habitat), or warnings of the environmental costs of overexploitation of forests. An example of this forest value orientation is: "In past years, when selective logging was the practice in old-growth forests, there was some care to protect the habitats of the wildlife within those forests. Now with the practice of clearfelling everything is removed or burned on the ground" (Rowlands 2001). We have used the term "ecological value orientation" for expressions of this value orientation.

Finally, we found expressions of a third forest value orientation that emphasized the noninstrumental values of forests such as moral value, spiritual and sacred values, place attachment, bequest value, historical and cultural values, and aesthetic value. We label this broad-ranging forest value orientation "moral/spiritual/aesthetic (MSA)." The MSA value orientation represents a cluster of noninstrumental values that focus on the worth of forest as an end in itself, rather than a means to some end. An example of the MSA value orientation is: "The declaration of the Tasman National Park (as part of the RFA) will enable the region to be promoted as the spectacularly rugged and stunningly beautiful part of God's earth that it is" (Weekes 1997).

## Methodology and Data

This study used the InfoTrend<sup>®</sup> software and method, which has been employed to successfully predict public opinion based on analysis of news media accounts on a wide range of topics. The InfoTrend method involves the creation of customized "lexicons" of words and phrases related to particular concepts of interest and then the development of computer instructions called "idea transition rules" that specify how various concepts represented by the lexicons are combined to generate new, more complex concepts (Bengston and others 2001; Fan 1988). For example, a lexicon of terms representing the concept "damage" (e.g., decimate, degrade, destroy) could be combined with a lexicon of terms representing "ecological objects" (e.g., ecosystem, forest, habitat) to code for the

concept "ecological damage." The four main steps of the InfoTrend method include: (1) downloading textual data; (2) filtering the downloaded text; (3) developing the lexicons and idea transition rules to code the text; and (4) checking the validity of the coding. These four steps are described individually.

### Downloading Data

Data for the analysis consisted of Australian news stories relevant to Australian native forest management contained within the LexisNexis<sup>®</sup> online commercial database. Most Australian news sources within LexisNexis commence in the late 1990s. The news stories downloaded were published between August 1, 1997 and December 31, 2004. Stories were downloaded from eight newspapers and one newswire service comprising the major daily metropolitan newspapers in Australia (Table 2). The search extracted stories that focused on RFA and native forest management in Australia. Restricting the text downloaded to that within 100 words of the search terms reduced the amount of irrelevant text retrieved.

### Filtering Text

Following the initial search and retrieval of text from the LexisNexis database, a filtering process was used to remove stories not within the scope of the study. Entire stories not related to Australian native forest management were initially filtered out. For example, there were a number of stories in the Australian news media that focused on the management of native forests in the broader Asian and Pacific regions, and these were removed entirely. A second filtering process removed paragraphs that were not relevant to the study. Following this process, there were 4034 stories with at least one paragraph within the scope of the study.

### Developing Lexicons and Idea Transition Rules

The coding scheme is the foundation of any content analysis, and in the InfoTrend method, the coding scheme is developed through the creation of lexicons and idea transition rules. The development of the lexicons and rules was an iterative process with random samples of paragraphs being used to develop, test, and then modify the lexicons and rules. Two coding schemes were developed for the study. The first focused on the three value orientations for native forests (i.e., developing lexicons and rules for the three value orientations discussed above: commodity,

**Table 2** News sources used in this analysis

News Source	Location	Frequency	Circulation <sup>a</sup> (Mon.–Fri./Sat./Sun.)
<i>Hobart Mercury</i>	Hobart, Tasmania	Daily	50,000/64,000/—
<i>Sunday Times</i>	Perth, Western Australia	Weekly	—/—/349,000
<i>The Age</i> <sup>b</sup>	Melbourne, Victoria	Daily	196,000/341,000/197,000
<i>The Canberra Times</i>	Canberra, Australian Capital Territory	Daily	39,000/71,000/39,000
<i>Daily Telegraph</i>	Sydney, New South Wales	Daily	432,000/349,000/—
<i>Sydney Morning Herald</i> <sup>b</sup>	Sydney, New South Wales	Daily	233,000/400,000/—
<i>Courier Mail</i>	Brisbane, Queensland	Daily	221,000/343,000/—
<i>Australian Financial Review</i>	National	Daily	91,000/79,500/—
AAP News Wire	National	daily	NA

<sup>a</sup> Circulation details provided by Audit Bureau of Circulations as cited in O'Halloran (2002)

<sup>b</sup> The LexisNexis database did not include the *Sydney Morning Herald* and *The Age* for the period May 2002 through December 2004. Stories from these newspapers for this period were obtained using the same search routine from an alternative online commercial database, Factiva, and were merged with results from LexisNexis

ecological, and MSA). The second coding scheme focused on the types of forest use.

To illustrate the coding process, consider the following paragraph:

The agreement guarantees the *timber industry* will be assured of a *supply* of 25,000 *cubic metres* of *sawlogs* a year, 23,000 from the Eden management area, for the first five years. (*Daily Telegraph* 2002; emphasis added)

The terms “timber industry,” “cubic metre,” and “sawlog” were all included in an idea category called “industry.” The word “supply” was one of many words and phrases included in an idea category of “economic” terms. An idea transition rule was written specifying that an incidence of an “industry” idea in combination with an incidence of an “economic” idea within the same paragraph generated a code of commodity value orientation. This was one of several sets of lexicons and idea transition rules used to identify expressions of this forest value orientation. Lexicons and idea transition rules were iteratively developed for each of the three value orientations. See Fan (1997) and Bengston and others (2001) for more detailed descriptions of the development of coding schemes using the InfoTrend method.

The second coding scheme developed for the study was concerned with direct human uses of native forests. Lexicons were developed for five types of use: wood products, grazing, mining, tourism/recreation, and a residual “other” category. Details describing each category are provided in Table 3. These five uses were related to the commodity value orientation only. Ecological forest uses (e.g., the use of a forest as habitat for a species or as a provider of ecosystem services) were not included in this coding.

Development of the coding schemes was an iterative process involving continuous testing and modification of lexicons and rules by applying them to random samples of text. Throughout this process, the coding was assessed for

accuracy and comprehensiveness and modified as required. Once the coding scheme was comprehensive, a formal validity checking process was conducted.

#### Checking Validity

In content analysis, a coding scheme is considered valid to the extent that it accurately measures the concepts it was intended to measure. After the final refinements to the values coding scheme were completed, the validity of the scheme was assessed through calculating Krippendorff's alpha on a random sample of 300 stories (Krippendorff 1980, 2004). Alpha values were as follows: commodity value orientation, 0.76; ecological value orientation, 0.81; and MSA value orientation, 0.77. These scores are very close or exceed 0.80, regarded as an acceptable reliability rate in content analysis (Krippendorff 2004).

#### Findings

The final database of Australian news stories used in the analysis comprised 14,413 paragraphs from 4034 relevant stories. Figure 1 shows the number of stories per month for the study period, August 1, 1997 through December 31, 2004. The volume of stories across the period was not constant, with increasing coverage occurring with major events in the forestry debate. The most striking feature over the period of the study was the dramatic peak in stories recorded in October 2004, corresponding to the federal election, in which native forest management in Tasmania was a key election issue. Major peaks in new coverage coincide with the signing of RFA agreements in November 1997, March 1998, May 1999, August 1999, March 2000, and April 2001. Other peaks in the coverage typically

**Table 3** Categories of forest use

Category	Category content
Wood	Use of native forests to produce wood and pulp products including sawlogs, specialty timbers, woodchips, and paper and pulp production
Grazing	Use of native forests for grazing livestock
Mining	Use of native forests for mineral and oil exploration and extraction
Tourism/Recreation	Use of native forests for tourism and recreation activities including camping and bushwalking, fishing, horse riding, 4-wheel driving, and holidays
Other	Use of native forests for nontimber products including the collection of mushrooms, bee-keeping, and botanical ingredients in herbal remedies

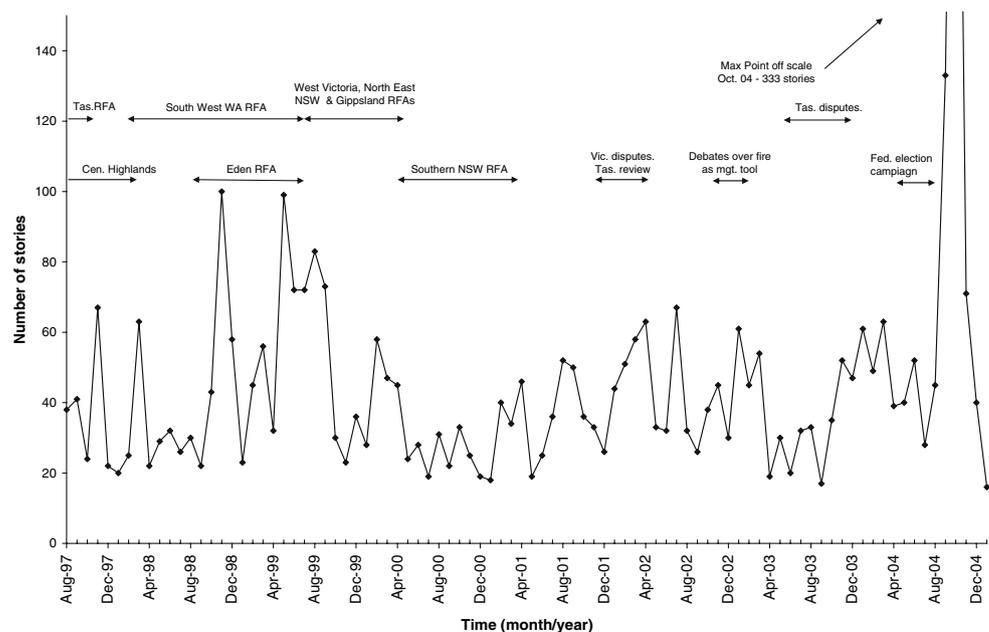
correspond to periods of increased conflict over forest management and can be linked to particular events. For example, in February 2002, the Victorian government announced the levels of hardwood sawlogs to be taken from Victorian forests would be reduced by 30% following a review indicating previous sustainable yield estimates were too high. Those employed within the logging related industries lobbied for compensation and this was reported widely. Throughout 2002, a 5-year review of the Tasmanian RFA was held involving public hearings and the release of background, draft, and final reports, and these events contributed to the peaks in media coverage through 2002.

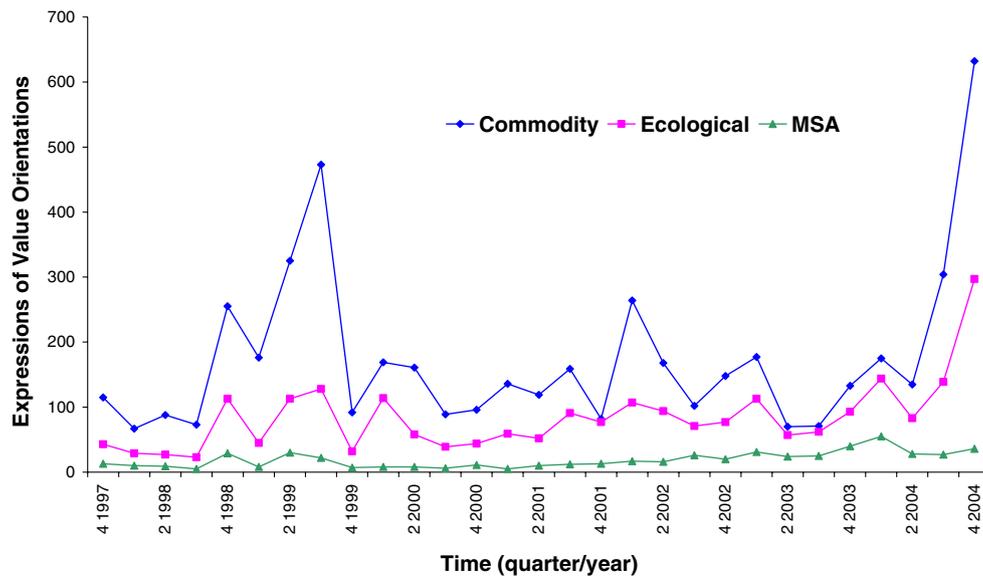
Figure 2 shows the absolute expression (i.e., number of paragraphs) of the three value orientations per quarter across the time period. As with the absolute expression of stories (see Figure 1), the number of paragraphs expressing the three value orientations was not constant and varied according to the level and nature of public discussion of native forest management. The pattern of value orientation expression was similar to the pattern observed for forest

stories in general (Figure 1). Figure 2 shows the commodity value orientation to be the most frequently expressed of the three forest value orientations. The ecological value orientation was not as prevalent, but at times, it was expressed about as often as the commodity value orientation. Expressions of the MSA value orientation were least frequent, but this perspective was a steady voice throughout this long-running public discussion.

Figure 3 also shows the relationship among the three value orientations, depicting the share of each as a percentage of the total number of paragraphs for each quarter. In this way, relative trends through time can be readily observed. Over the almost 6.5-year period, the commodity value orientation has decreased relative to the other two value orientations, whereas the shares of the ecological and MSA value orientations have increased. Logit analysis was used to test the significance of the trends in value orientations over time. The logit form of regression was appropriate because the dependent variable is the relative frequency or proportion of expressions of each value orientation. This approach ensures that the implied or

**Fig. 1** Number of forest management related news stories and major periods of RFA negotiation, August 1997 through December 2004





**Fig. 2** Absolute expressions of each forest value orientation (number of paragraphs), fourth quarter 1997 through fourth quarter 2004

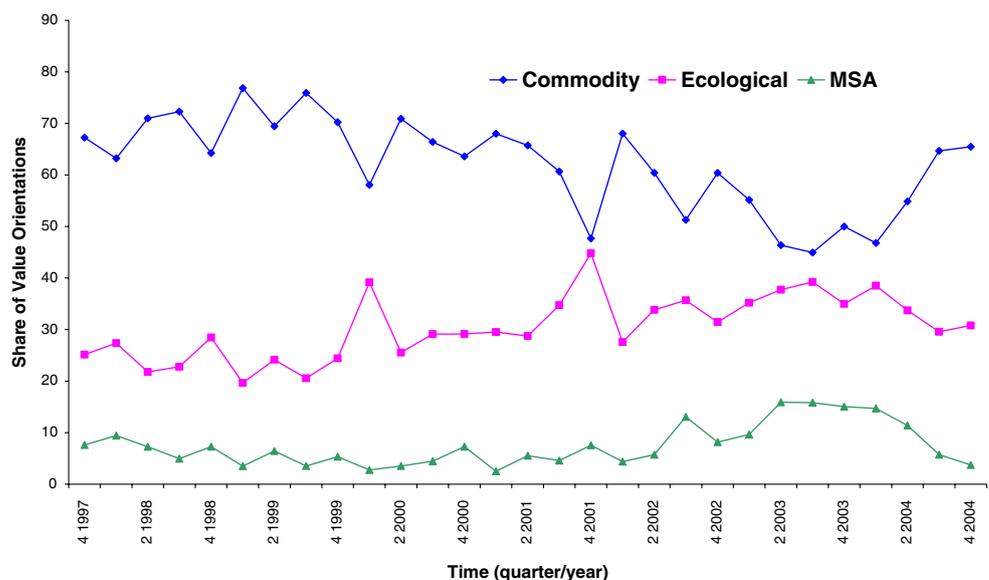
predicted value of the dependent variable is constrained to be positive and less than 1, thereby not violating its interpretation as a relative frequency. We found a negative relationship between the date of response (i.e., quarter) and the proportion of commodity value orientation ( $P < 0.01$ ) and positive relationships between the date of response and the proportion of ecological and MSA value orientation ( $P < 0.01$  in each case).

The last three quarters shown in Figure 3 (second through fourth quarters of 2004) show a reversal of the overall trends throughout the entire time period of our analysis. These three quarters correspond to the run up to the federal elections in Australia, resulting in heightened

politicization of the public discourse about forest management and a massive increase in the number of expressions of the commodity value orientation in the last two quarters (Figure 2). The political party with a more sympathetic policy toward commodity production dominated the public discourse and ultimately won the election.

The second coding scheme developed was for the various direct human uses of native forests (Table 3) and provides a more detailed breakdown of the uses underlying the commodity value orientation. The dominant human use discussed was the production of wood and paper products, which accounted for ~85% of the coded paragraphs (Figure 4). After wood and paper products, recreation and

**Fig. 3** Share of each forest value orientation (percent of total expressions), fourth quarter 1997 through fourth quarter 2004



tourism uses were the most commonly mentioned but at a significantly lower level, averaging around 6%. Although it represents a small share of the discussion of human uses, recreation and tourism discussion has increased gradually over time. Grazing, mining, and the residual “other” category accounted for the remainder.

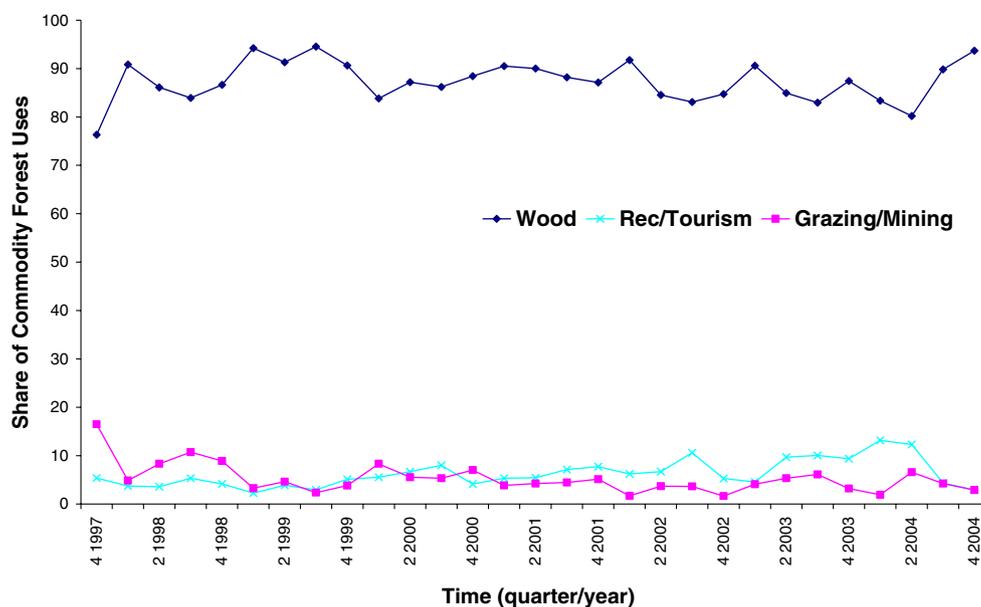
## Discussion and Implications

Greater understanding of the nature of forest value orientations, their relative importance, and how they have shifted over time is important to the effective management of public forest resources in Australia. This analysis has demonstrated that Australian forest value orientations can be monitored through the use of readily available secondary data sources. We have highlighted periods of intense public discourse about forest management, as well as provided a measure of the frequency of expression of three value orientations: commodity, ecological, and MSA. Additionally, the analysis has shown trends in the relative shares of these value orientations. Over the time period examined, there was an overall and statistically significant decline in the relative expression of the commodity value orientation coupled with an increase in the shares of the ecological and MSA value orientations.

The trend of a declining commodity value orientation and an increasing ecological value orientation is consistent with other studies of Australian forest and environmental value orientations (Dargavel 1995). Similar changes in

relative importance have also been observed in the expression of forest value orientations in the United States (Bengston and others 2004). Inglehart’s (1990) postmaterialist thesis offers an explanation for these shifts in forests values and, more generally, in environmental values. Extending Maslow’s hierarchy of needs, Inglehart suggested that as a society’s socioeconomic position improves, individuals having satisfied their material needs (such as food and shelter) will focus on the satisfaction of higher-order needs concerned with quality of life (such as love and aesthetics). The decreasing relative share of commodity value orientation and increasing shares of ecological and MSA value orientations we observed might be an expression of this more general societal trend away from material values and embracing postmaterial values.

As shown in Figures 2 and 3, expressions of the MSA value orientation were a small share of the overall forest management discussion. It has been argued that the types of value that MSA encompasses, the nonutilitarian and more symbolic values, are expressed less frequently in Western culture than utilitarian and environmental value orientations (Winter and Lockwood 2004). Thus, the lower levels of expression of MSA value orientation do not mean that they are unimportant—they are typically strongly and deeply held values that are often held simultaneously with an ecological value orientation. Indeed, it is likely that these deeply held values for natural environments can provide a strong personal basis for opposition to utilitarian uses of natural environments and help explain the intensity of conflict over forest management in Australia.



**Fig. 4** Share of direct human uses of forests (percent of total expressions), fourth quarter 1997 through fourth quarter 2004. (Note: Grazing and mining have been combined, and the residual “other” category has been excluded for ease of display)

This analysis has highlighted the presence of multiple value orientations within news media discourse reflecting the multiple value perspectives that the public and other stakeholders bring to evaluating native forest management. The diminution of commodity and increase of ecological and MSA value orientations underscore the importance of ensuring that multiple values are recognized and incorporated into forest management and policy. In Australia, the RFA process sought to satisfy both conservation and development objectives through the establishment of additional reserves and the development of an internationally competitive and ecologically sound forest products industry (Commonwealth of Australia 1995; Lane 1999). However, the effectiveness of the RFA process in delivering a native forest management that recognizes and integrates the management of multiple values has been questioned from a range of perspectives (e.g., Lane 1999; Musselwhite and Herath 2005; Slee 2001). Indeed, the level of conflict over competing forest values is evident through the frequent and often clashing expressions of value orientations from the two ends of the biocentric–anthropocentric value continuum (see Figure 2).

By far the highest peak in news stories focusing on forest management occurred during the federal election campaign during September–October 2004 (see Figure 1). The election provided an opportunity for forest values to become prominent in the public discourse. During the run up to the election, the number of expressions of both commodity and ecological value orientations increased dramatically as different groups asserted their preferred outcomes for native forest management (see Figure 2). Interestingly, the number of expressions of the MSA value orientation did not change appreciably during the fourth quarter of 2004 from the preceding period. While both commodity and ecological value orientations rose absolutely, in relative terms the commodity value orientation increased while both ecological and MSA value orientations decreased (see Figure 3). Ultimately, the party with a more sympathetic policy toward the commodity values won the election. Subsequently, however, a new Community Forest Agreement between the Tasmanian and Australian governments was negotiated within the existing RFA, delivering greater protection to areas of old-growth forest in Tasmania in addition to further investments in timber processing employment (Commonwealth of Australia and State of Tasmania 2005).

A better understanding of forest values, value orientations, and how they are changing over time can help forest managers and policy-makers in several ways. First, information about forest values and shifts in values can help policy-makers define strategic directions and establish socially acceptable goals for forest management. Environmental policy and the management of public lands must

ultimately be consistent with the broad ways in which citizens value their public lands (Norton and Steinemann 2001). Second, clarifying forest values can also help in identifying appropriate means for forest management (i.e., selecting socially appropriate policy alternatives and management practice). Finally, because environmental value orientation is an important determinant of the level of trust that people have in natural resource management agencies (Steel and others 1992–1993), a clearer understanding of forest values and value orientations could facilitate building trust and managing conflict.

This article has illustrated one approach to monitoring the social environment for forest management. The shifts in forest value orientations we observed—with a decreasing share of commodity values and increasing shares of ecological and MSA values—suggest the importance of continued social monitoring related to forest policy and management. Forest values and value orientations will continue to shift as society changes, and it is vital for public forest managers and policy-makers to monitor and respond to these changes, developing policies and management strategies that are in tune with changing forest values.

**Acknowledgments** We would like to thank the Organisation for Economic Co-operation and Development (OECD) Co-operative Research Programme, Biological Resource Management for Sustainable Agricultural Systems, for a fellowship that enabled Dr. Webb to participate in this research effort. The USDA Forest Service, North Central Research Station and the Bureau of Rural Sciences, Australian Department of Agriculture Fisheries and Forestry provided additional support. The authors thank Ian Byron, Jackie Schirmer, and four anonymous reviewers for helpful comments on an earlier version of this article.

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