SECTION 3

Study 2
The Human System

Exploring the Human Component of the Ecosystem

Three adult cassowaries, another perspective.
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The task of unravelling such a difficult creature as ***Homo sapiens*** *is so awesome that the social sciences need all the help they can get. They should leave no stone unturned, no tool unused in pursuit of anything that might offer further insight.*

Barash, 1977, p.276.

The environmental crisis is an outward manifestation of crisis of mind and spirit. There could be no greater misconception of its meaning than to believe it to be concerned only with endangered wildlife, human-made ugliness, and pollution. These are part of it, but more importantly, the crisis is concerned with the kind of creatures we are and what we must become in order to survive.

Caldwell in Pister, 1994, p.341.

For all scientific problems, it is through human perception that the challenge to conventional knowledge is raised, through human values that it is accorded importance or ridicule, and through the culture of science that the problem is organized and solutions pursued.

Machlis, 1992, pp. 161-162

Chapter 10

Toward "Understanding" *Humans* and *Human Systems*

10.1 Introduction

The second major task in this exploration of the human-natural environment interface is to investigate the other important inhabitant of the ecosystem, *Homo sapiens* - an inhabitant on whom the survival of the target species of the first study, *Casuarius casuarius*, depends. This dissertation has so far addressed many current concerns and issues which underpin endangered species recovery - cassowary recovery in particular - and the

environmental management debates of the 1990s. Central to these discussions has been the notion that analysis of environmental concerns and issues relevant to environmental management in general and endangered species recovery in particular requires a basic understanding of *humans* and *human systems*. As Hockett (1973) wrote:

> Any study or discussion of nature that ignores man's presence is necessarily incomplete. Likewise, any discussion of human affairs that pretends man is not part of nature and subject to all the "laws of nature" (whatever they may be) is founded on fantasy. (p.20)

The general aim of this second study is to generate such an understanding through an exploratory analysis of the human component of the ecosystem. As with the first study, such an analysis entails multiple tasks for the researcher, and, as with any species, human-natural environment relations are not straightforward. Indeed they are highly complex, presenting many theoretical, methodological, and analytical challenges. In this study a principle theoretical and methodological challenge has been to decide on the most useful way to frame and conceptualise this complex and highly dynamic system in the service of theory advancement and understanding as well as application. This has necessitated explaining a number of alternate perspectives, which in turn have provided the theoretical basis and conceptual vocabulary for organising the empirical observations. Furthermore, these alternate perspectives have provided a particularly valuable way of thinking about individual responses to the natural environment promoting an holistic understanding of *humans* and *human systems* rather than a reductionist view. In this exploratory analysis a conscious attempt has been made to maintain a balance between the importance of theory and analytic accuracy and clarity, on the one hand, and the pragmatic needs of environmental management on the other.

10.1.1 Study Outline

This second study is presented in six chapters. The focus of this first chapter, which will be outlined in more detail in the next section, is the presentation of a selection of disciplinary-specific approaches to framing *humans* and *human systems* in addition to a theoretical framework for integrating theory with research. This is followed in Chapter 11 with an outline of the methodology and methodological issues that are particularly relevant to this inquiry. The foci of the next three chapters, 12, 13, and 14, are theoretical and empirical explorations of three specific ways of conceptualising and operationalising *individual* and *community* representations and understandings of the natural environment - environmental management, ecology and psychology. Chapters 12 and 13 essentially

demonstrate the conventional process of research where theoretical frameworks and measurements are established prior to the research effort and analysed and presented accordingly. Chapter 14, however, has evolved as a "post hoc" consideration. It has evolved out of the research effort itself, building on the information from the literature as it was reviewed, on discussions and collaborations with colleagues as they proceeded, and on the analysis of the data set as it progressed. It genuinely represents an exploratory effort and a "working" conceptual framework. The decision was made to include this chapter since it does offer an additional and valuable perspective on the natural-human environment interface and reflects fairly the exploratory character of the dissertation as a whole. The final chapter, Chapter 15, focuses on the integration and synthesis of the research findings in terms of environmental management and theoretical advancement. It is important to note that throughout this study the emphasis is not on promoting a single theoretical perspective but rather on recognising the distinctive contribution that particular approaches, perspectives, concepts, and theories can make toward a more complete understanding of *human* and *human systems,* particularly in the context of environmental management.

10.1.2 Chapter Outline

The search for an appropriate way of conceptualising the human component of the ecosystem begins in this chapter with an examination of several disciplinary-specific ways of framing the human system. Accounts from three quite different perspectives characterising the natural and social sciences - environmental management, ecology, and psychology - are reviewed. Each of these perspectives provided important and unique insights into the human system, laying the groundwork for this framing process. This study attempts to integrate the key aspects of all three perspectives which are of particular relevance. These include: (i) the applicability of human systems research to environmental management; (ii) the dynamic, complex and reciprocal nature of human-environment interchange; and (iii) the underlying psychological processes associated with individual and community representations and understandings of the natural environment. The inclusion of an environmental management perspective, which basically provides the rationale for incorporating the human component of ecosystem functioning into endangered species recovery programs, continues to remind us of the importance of the applied nature of the research. Environmental managers must not only be able to usefully conceptualise humans and human systems, they must also monitor, educate, "manage", anticipate and plan for change, and change people. In addition, for managers to be successful in developing and implementing management strategies, they must recognise that part of any contemporary management task is "managing" people, both within and

outside the agency, and on individual and community levels. By placing humans on the same level as other species in the ecosystem, this makes for a more genuine ecosystem approach with humans situated *in* the analytical system not outside it. The psychological perspective focuses on the notion that humans are "unique" among species in that they have a number of species-specific characteristics of particular relevance to environmental analysis and management. Humans differ noticeably from other species in that the extent of their mental processing abilities allows them to be purposeful, rational individuals in that their representational, symbolic, communication, reflective, and cultural capacities have allowed for a dramatically different type of environmental encounter and transformation.

The second section of this chapter briefly explores two person-environment transaction theories from social and environmental psychology. The emphasis here is not on whether one or the other approach to theory, assessment, and research is right or wrong. Rather it is on what each has to offer this exploratory analysis of the human component of the ecosystem, particularly in the context of research design and methodology. The proposed integrative theoretical framework pulls together a number of core themes from the theoretical positions discussed, providing a set of working assumptions about the environment and the person which serves as a guide to this research and to the analysis of problems highlighted by this research. These core themes include: (i) the need to address *individual* and *community* or *shared* understandings of the natural environment in the study of human-natural environment interchange; (ii) the importance of environmental or contextual factors in understanding human-natural environment interchange; and (iii) the pragmatic need for a multi-method approach combining both environmental and psychological factors in applied research. This multi-method approach allows for a holistic understanding of person-environment transactions.

The final section of this chapter outlines the research as it unfolds in this present study. It begins by presenting the rationale, research focus and aims of the study. This is followed by an overview of the research framework which summarises the theoretical concepts of particular relevance to this study, the research process, and the key concepts/constructs used to frame individual and community representations and understandings of the natural environment. The chapter concludes with a brief discussion of conceptual and operational issues.

10.2 The Human System: Three Disciplinary-Specific Perspectives

10.2.1 An Environmental Management Perspective: Humans as the Target of Management

> We can begin from the premise that our basic approach to environmental management must be rethought, a process that has already begun in earnest but remains in a state of considerable confusion. (Norton, 1992, p.23)

Norton's statement reflects the sentiments of many ecologists, environmental scientists, psychologists, and environmental managers who have been theoretically and pragmatically dealing with the environmental crisis for a number of years. What is needed, they say, is to understand environmental management as taking place on multiple levels and in pursuit of multiple goals. The task is to integrate these levels and goals and to reduce conflicts among them. To do so environmental management must draw on the scholarship of the natural and social sciences, and it must "reconcile the analysis of the environment and society" in order to deal effectively with the current crisis (Mannion & Bowlby, 1992).

10.2.1.1 Managing the Environment involves Managing People

> I was primarily concerned with the problem of how the effective management of wildlife often seemed less a problem of manipulating animals and their habitats than managing our own species' often callous and destructive disregard for much of the natural world. This perspective had certainly not originated with me. Aldo Leopold, one of the wildlife profession's pioneering ecologists, had suggested more than half a century before: "The problem of [wildlife] is not how we shall handle the [animals].... The real problem is ... human management. Wildlife management is comparatively easy; human management is difficult." (Kellert, 1996, pp. 3-4)

While the world of environmental management is challenging and complex enough on the biological front, a key aspect of any management process, as Kellert and Leopold indicate, is the management of people, both within and outside management agencies and across all levels of society. This reality is dramatically demonstrated in all of the endangered species management case studies presented by Clark et al. (1994), and in the

writings of Schaller et al. (1985), Schaller (1994), Yaffee (1994a, 1994b), LaBastille (1990), Grumbine (1992), Reading (1993), and Beatley (1994), to mention just a few individuals who have been involved in species-specific biological and management studies. These studies reflect situations that are desperately in need of a more useful knowledge base with respect the human component of the ecosystem. To date, effective environmental management and species recovery has been limited by the misconception that the management of physical ecosystems and target species is required rather than addressing ecosystems as a whole in which humans are an integral part[1].

But what does "managing" people mean? Within the context of a traditional environmental management approach, managing people means controlling access, enforcing compliance and regulations, developing and implementing policies, handling public relations issues, disseminating information, education, etc. Today, managing people means, in addition to the above, establishing codes of practice that are acceptable to all, resolving conflicts within and outside the agency, defining property rights, negotiating political and practical courses of action, facilitating public consultation, monitoring community concern, changing people's understandings, values, and hopefully behaviour, assessing probable or potentially damaging impact, measuring changes in perceived environmental quality, quantifying ecosystem well being. People are central to all of these tasks.

Managers therefore require at least some basic knowledge and understanding of individual needs, desires, motivations, activities, representations and understandings of the natural environment. Furthermore, they need to address communities as a whole in order to work with and manage communities, to measure and monitor community impact on ecosystems and vice versa, and to understand the processes that lead to environmental degradation. Finally, environmental managers need to know how to be effective change agents, how to be skilled at providing pragmatic corrective strategies, and how to work effectively and efficiently as a coherent force amidst the diversity of opinions, values, and understandings that currently exist both within the agency and the broader community. To achieve such outcomes, environmental management must draw on the wisdom of the social sciences, wisdom which is not infallible but there to offer guidance and to provide some tools for developing and implementing highly complex management policies and procedures.

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[1] This holistic notion of the ecosystem has been explored in detail in the first three chapters of this dissertation.

10.2.1.2 Understanding Links Between People - Behaviour, and Ecosystem Functioning and Well Being

Environmental managers cannot afford to neglect examining the links between people, behaviour, and ecosystem functioning and well being if they are to understand and influence patterns of destructive behaviour towards nature. These are links which are multi-faceted and complex and which social science has investigated extensively. There is no doubt that human behaviour has had a significant impact on ecological functioning and well being, particularly since the agricultural revolution (Dorst, 1976; Ehrlich et al., 1973; Sauer, 1956). It is also without doubt that every natural ecosystem on the planet has been altered in some way by humanity, many irreversibly (Ehrlich, 1993; Meffe & Carroll, 1994; Thomas, 1956a, 1956b). The history of environmental problems is extensive and firmly embedded in human behaviour.

An important goal for management of biodiversity loss would be to change destructive modes of human interaction with the natural environment. This is extremely difficult, with two reasons being particularly salient. Firstly, the problems arising out of environmentally destructive behaviour involve multiple forces: different people, different situations, different activities, different reasons (Kellert & Clark, 1991; Meffe & Carroll, 1994). Common ground and hence acceptable solutions are therefore difficult to achieve. Secondly, there is a tendency toward simplification of the complex problem of biodiversity loss. Reducing this complexity to single causes such as human population growth, social structure, materialism and our desire for economic growth, our choice of technologies, lack of an environmental ethic, etc., is limiting, inappropriate, and distorting. Meffe and Carroll (1994) write:

> Each small, simplified picture of the problem pins the blame differently and suggests a different simple solution that appeals to different interest groups. In fact the blame is largely indirect and widely dispersed, and the solutions will be multiple and complex. But, to date, the politics of reducing biodiversity loss has largely been carried out among groups who find particular combinations of simple censure and new directions to be in their own interest. (p. 440)

These are translated into several very pragmatic concerns for environmental managers. How do individuals and communities represent and understand the natural environment? How do these representations and understandings influence the behaviours impacting on ecosystem functioning? How can environmental managers effectively intervene in this psychological and social domain to effect positive behaviour change? How can managers

recognise, access, monitor and use community concerns as a critical indicator of ecosystem well being as well as a constructive avenue for behaviour change? A useful digression, here, is a more disciplinary-specific and theoretical consideration of the social psychology of attitudes and attitude change, underlying belief systems and value orientations, environmental concern, and the person-environment-behaviour link.

10.2.1.3 Measuring and Monitoring Ecosystem Functioning and Well Being

In addition to the conceptual and theoretical challenges posed by environmental problems such as biodiversity loss, there are important methodological issues that environmental managers need to address. Management that takes environmental protection seriously is ultimately concerned with measuring and monitoring environmental functioning and well being (Constable, 1991). Often there is a legal requirement for scientific input in impact assessment and other responses to environmental management (Fairweather, 1993; Freudenburg, 1989; Gramling & Freudenburg, 1992). In the biological sciences, desirable ecosystem conditions and/or components such as species numbers and diversity are assessment endpoints for management (Mace & Lande, 1991).

On the other hand, a social science perspective is premised on the understanding that all environmental standards, impacts or measures are ultimately human judgements involving human yardsticks. These judgements are strongly influenced by shared societal representations and understandings about what is beneficial or damaging to the environment and ultimately to people (Evans & Cohen, 1987; Reser et al., 1996). The important conceptual issue is whether perceived threat to self, others and/or the environment mediates taking action (Stern et al., 1993). Measures based on individual appraisal or perceived environmental degradation are no less valid or conclusive than corresponding physical (objective) measures because, irrespective of the nature or status of the "physical" evidence, it is only through our social construction of and engagement with the problem that action will be taken or that what action can be taken will be determined (Evernden, 1992; Machlis, 1992).

Gramling and Freudenburg (1992) outline the consequences of what they refer to as "opportunity-threat" impacts in the case of development proposals, impacts which highlight the role of social indicators, and which equally well explain public responses to environmental regulatory/legislative procedures proposed by management agencies.

> In the biological or physical sciences, it may be true that impacts do not take place until concrete alterations of physical or biological conditions have occurred. With the human environment, however, measurable impacts begin as soon as there are changes in *social* conditions - often from the time when information about the project first becomes available. As Freudenburg and Gramling (1992:941) note, speculators buy property, politicians manoeuvre for position, interest groups form or redirect their energies, stresses mount, and a variety of other social and economic impacts take place, particularly in the case of facilities that are large, controversial, risky, or otherwise out of range of ordinary experiences for the local community. These changes have sometimes been called 'pre-development' or 'anticipatory' impacts, but they are far more real and measurable than such terminology might imply. (pp. 218-219)

"Pre-emptive" clearing by landowners is an example of the "anticipatory" impact of government regulations and is a common occurrence in this country. The most salient immediate case was the destruction of critical cassowary habitat adjacent to the study site in which the biological research was conducted(see Chapter 9, Section 9.3.6). Such impacts argue for management decisions themselves requiring reasonable environmental impact assessment - including the social environmental impact of the decisions. In the practice of assessing and managing environmental problems there is the need therefore to integrate both natural and social science assessment strategies. A critical limitation of only one principal assessment strategy is that it can lead to erroneous conclusions about outcomes and directions for decision and policy making.

Measuring and monitoring also implies an evaluation process which is particularly valuable in demonstrating the effectiveness, efficiency, and equity of management policy and programs. Such an evaluation implies a post hoc assessment of programmatic efficiency which is intended to provide "objective" information relevant to administration and political decision making (Gist & Lubin, 1989). Oskamp (1995) suggests that, "evaluation of environmentally relevant programs and policies after they have been implemented" ...is... "particularly important because many programs are put into place based on intuition rather than tested knowledge" (p.223). Gist and Lubin (1989) note, however, that evaluation research studies can have their problems. They can be shaped by a number of contextual variables; being "inextricably intertwined with the social and political contexts in which they were conceived and executed" (p.3). Objective evaluation data may appear to provide clear and welcome solutions, but when such data contradicts or questions entrenched views, the evaluator and the results may often be discarded (Gist & Lubin, 1989).

10.2.2 An Ecological Perspective: Humans as Just Another Species in the Ecosystem

An ecological perspective of the human system views humans as another species in the ecosystem. In doing so it attempts to extend findings, concepts, and theoretical frameworks from biology and ecology to the analysis of human relations with the environment (Saegert & Winkel, 1990). As outlined in Chapter 2, there is a human ecology perspective of some maturity, having been well represented in human geography and anthropology writings going back fifty years. Rather than readdressing this literature, the emphasis here is on three core themes from these perspectives which are particularly relevant to framing and understanding the human component of the ecosystem.

A central tenet of ecological models encompassing human systems is that humans are part of a complex dynamic ecosystem which has three core features. These include: (1) environment and human behaviour are closely intertwined; (2) there is a mutual and dual impact between humans and their environment; and (3) human-environment transactions are dynamic, continuously changing relations (Altman, 1976). It is interesting to note that some of these important ecological concepts were not always in evidence in their application in the natural sciences, rather many of them took a long time to mature. For example, the concept of the dynamic biological community displaced early notions of single independent organisms and a "balanced" nature as late as the 1970s (Darling, 1971; Peters, 1991).

10.2.2.1 The Close Intertwining of Environment and Behaviour

One ecological principle that well demonstrates the close intertwining of environment and behaviour is adaptation, the most pervasive characteristic of biological systems (Peters, 1991; Putman & Wratten, 1984; Snow, 1976). Essentially, adaptation is a process whereby an organism self-regulates in order to maintain itself by accommodating or adjusting in various ways to changes in the environment. Adaptation is described by natural scientists as conformity between the organism and its environment (Pianka, 1978).

According to the adaptation paradigm as it is used in the social sciences, the goal of the biological and psychological individual is survival, which is what motivates behaviour (Saegert & Winkel, 1990). Expressions of success or failure of the individual to respond adaptively to environmental challenges include states of health or disease (Dubos, 1965).

Leiss (1976) refers to this as the biological-cultural distinction of human needs which differentiates humans from other species. It is this very alienation of humans from natural environmental functioning in terms of processes and feedback mechanisms which control other species behaviour that many suggest is the cause of contemporary environmental crises (e.g., Ehrlich et al. 1973; Stern, 1992; Stern et al. 1992)

10.2.2.2 Reciprocal Interaction between Humans and their Environment

Conceptualisation of the human-environment relationship deriving from the natural sciences makes use of the notion of a holistic system in which reciprocal interaction between organisms and their environment occur[2]. The ecosystem concept represents a type of environmental system that includes all living organisms between which there are continuous exchanges. In addition, it emphasises interdependency. The ecosystem concept provides an encompassing and holistic framework that unites environment and society and has been used by researchers in the social sciences to explore the many aspects of reciprocal interactions between humans and the natural environment (Altman & Rogoff, 1987; Bell et al., 1996; Bonnes & Secchairoli, 1995; Mannion & Bowlby, 1992). This clearly implies that social, psychological, and physical processes should be examined as interacting parts of an environmental system (Altman & Rogoff, 1987; Bell et al., 1996; Mannion & Bowlby, 1992), characterised by a mutual and dual impact between organisms and their environment.

10.2.2.3 Dynamic and Complex Human Systems

The traditional conception of a fixed environment to which organisms must adapt or perish has now been replaced by the view that emphasises the dynamic interchange between the organism and its environment. Earlier notions of the ecosystem were of single organisms acting independently of one another (Darling, 1971; Peters, 1991), with ecologists once maintaining that there was a unitary process - simple linear systems (Pimms, 1991). However, advances in ecology, palaeobiology, and conservation biology have called into question the notion of "balance", "stability", "equilibrium" (Pimm, 1991; Reid, 1994), traditionally considered to be descriptions of how natural systems behave over the long term. By the 1970s ecologists recognised that the dynamics of natural systems might be highly nonlinear.

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[2] This notion of the holistic ecosystem concept has been outlined in detail in Chapter 2.

As with the natural sciences, psychology now recognises that person-environment relations are also dynamic, continuously changing relations. Ittelson et al. (1974) write, "man is a *dynamically organised system* whose behaviour and experiences at all times expresses the interactive consequences of (these) processes and functions" (p.83). The acknowledgment of the dynamic nature of human-environment relations has been particularly evident in the development of transactional approaches in psychology and environmental psychology (see for example, Altman, 1976; Altman & Rogoff, 1987; Bonnes & Secchairoli, 1995; Ittelson et al., 1974; Reser & Scherl, 1988; Stokols, 1995; Wapner, 1995).

10.2.3 A Psychological Perspective: Humans as a "Unique" Species in the Ecosystem

A psychological perspective of the human system provides yet another way of looking at, understanding, and relating humans to the environment. The core tenet of this perspective is the uniqueness of humans compared to other species in terms of their ability to communicate their perceptions, representations, and understandings, their culture and technology, and their rational and purposeful conduct.

10.2.3.1 Conceptualising the Person

For some purposes, as outlined in the previous section, it is helpful to consider humans as just another species reacting to the physical environment. For other purposes it is necessary to recognise the role of human volition, the power, variety and complexity of the values and motivations of humans and their ways of interacting with the environment.

> When man endeavours to change his surroundings he is doing something that is characteristic of all animal species. Three features of this interchange with the environment however are uniquely human: first, its *extent*; second, its *deliberate and self-conscious implementation*; and third, its *complexity*. The evolutionary niche which man occupies on the phylogenetic scale of life is characterized essentially by this ability to modify the environment to serve a wide range of human needs. In so doing he differs noticeably from other animals, which stress adaptation to the environment in an effort to be comfortable and to survive. (Ittelson et al., 1974, pp. 3-4).

Humans are a unique species. Unlike other species the *extent* of the interchange between humans and the environment has been and continues to be substantial. The face of the earth has been reshaped extensively such that this change now imposes an unprecedented burden on the ability of humans to adjust (Ittelson et al., 1974). Unlike other species humans exercise control over their environment. They alone can carry out *deliberate and self-conscious* changes, modifying the environment to suit their needs, shaping their future; reversing a modified environment will only occur through *deliberate* and *self-conscious* effort. The driving force to change behaviour is therefore dependent on *complex* psychological processes. Unlike other species humans are able to "conceptualize and order environmental phenomena into a coherent pattern of images, expectations, and meanings" (O'Riordan, 1976b) which they can communicate and which therefore can be measured and monitored, assessed and evaluated. This allows researchers to empirically analyse the perceptions, representations, and understandings of people. By focusing on people the underlying assumption is that they are thinking, purposeful, and psychological if not always rational individuals.

10.2.3.2 Psychological Processes in the Human-Environment Interchange

There has been a considerable social science investment in the analysis of the human-environment interchange. Environmental problems and consequential human-natural environment relations have been one focus of this investment. Disciplines such as geography, sociology, anthropology, philosophy, policy science and psychology have made a considerable contribution (see for example, Attfield & Belsey, 1994; Bell et al., 1996; Brewer & Clark, 1994; Dunlap & Mertig, 1994; Mannion & Bowlby, 1992; Milton, 1993; Pepper, 1996; Redclift & Benton, 1994; Stern et al., 1992). The social sciences which have focused in particular on the psychological processes of perceptions, representations, and understandings of the environment have been sociology and social and environmental psychology. The sociological investment has principally reflected an interest in political beliefs and ideologies, and social movements, reflecting a societal level of analysis. Social and environmental psychologists have been more interested in the nature of the connections between specific constructs such as attitudes, beliefs, values, knowledge, concerns, and behaviour, and how to be effective in changing behaviour at an individual and community level. The different constructs social and environmental psychologists have used to frame individual and community perceptions, representations, and understandings of the natural environment, underlying mediating and moderating psychological processes, and an examination of the attitudes, values and concerns of three north Queensland communities, are the focus of this study. Details will be outlined in the final section of this chapter and in the chapters to come.

10.3 A Theoretical Framework for Investigating and Integrating the Person and the Environment

There have been a number of theories and models developed in social science which address the person and the environment. When one endeavours to classify the theoretical attempts at the synthesis of person/environment/behaviour it appears they fall into three main categories according to whether they take *a person-centred* perspective, an *environment-centred* perspective, or a *person x environment* perspective (Altman & Rogoff, 1987; Sampson, 1976). Each of these perspectives has been adopted by various social science disciplines at one time or other. In addition, each is important in the development of the methodology adopted in this study as each provides a rationale for integrating environmental and personal factors in the analysis of the human-environment interface. An overview of these perspectives follows.

10.3.1 Person-Centred Perspective

According to the strict *person-centred* perspective, the environment plays no part in determining behaviour. Rather, humans themselves determine behaviour (Ittelson, 1976). Intrapersonal cognitive and emotional factors are considered to be essential determinants of behaviour (Walsh et al., 1992b). As such, the *person-centred* perspective "assumes that our behaviors can best be understood by focusing on underlying dispositions that lead us to behave in a particular manner" (Sampson, 1976, p.5).

Person-centred theories focus primarily on "individual motivation, needs/satisfaction, or the pursuit of some goal" (Walsh et al., 1992b). In an attempt to understand these motivations, needs/satisfaction, and ultimately why people behave the way they do, most of the emphasis in research and theory development has been placed on the role of *perceptions*, *representations* and *understandings*, each considered crucial to the person-environment interchange (Ittelson et al., 1974). Ittelson et al. (1974) write of *perception*, "each individual perceives or experiences the world about him in individual and unique ways; perceived as well as objective reality guides his actions and determines whether the satisfactions he seeks will be achieved" (p.6). The subjective experience highlighted in this relationship between perception and behaviour is grounded in the phenomenological approach to the investigation of personality (Carver & Scheier, 1988; Phares, 1988; Pervin, 1989), "The basic assumption of most phenomenological perspectives is that a person's behaviour is largely determined by the way he or she perceives and understands

events. Events do not cause behaviour, but people's perceptions of these events do" (Phares, 1988, p.162).

The two principal theorists in this area focused on different aspects of the phenomenal world; Carl Rogers presented the person-centred approach, George Kelly, a personal-constructs approach (Carver & Scheier, 1988; Phares, 1988; Pervin, 1989). For both, the phenomenal field was reality for the individual. To Rogers, all reactions of that individual are based on the phenomenal field as it is experienced and perceived in terms of feelings and emotions - here the role of perception is important; individuals are feeling, experiencing beings. To Kelly, individuals attempt to construe their world; they interpret, try to understand, and explain their world - here the role of cognition is important; individuals are thinking, knowing beings. For an understanding of all of these processes, a knowledge of internal factors such as attitudes, beliefs, values, concern and knowledge, their interrelationship and their relationship to environmentally responsible behaviour is crucial (Ittelson et al., 1974).

10.3.2 Environment-Centred Perspective

A diametrically opposed position to the strict *person-centred* perspective developed concurrently, was *environmental determinism.* The conventional way of thinking about the environment in psychology was a complex set of causal factors or external situations which either directly caused or strongly modulated behaviour. Research which increasingly focused on physical environmental factors and variables carried with it a rather strong environmentally deterministic flavour. This was especially true of natural environmental "forces", though architectural determinism was also an ubiquitous feature of early writings. Contemporary environmental psychology approaches are more informed by information processing theories which place greater emphasis on how individuals appraise, construct, and represent physical environments and physical environmental variables including threats by and threats to the natural environment, e.g., a cyclone warning on the one hand, and environmental degradation on the other.

The idea that environmental factors and conditions can influence behaviour is central to understanding the person/environment/behaviour link. The condition or characteristics of the physical environment and its impact or influence on the psychological environment is an area of psychology which received considerable theoretical and analytical attention (see for example reviews of Lewin, Brofenbrenner, Proshansky in Bonnes & Secchiaroli, 1995; Itteslon et al., 1974; Proshansky et al., 1976; Rotton, 1986; Sampson, 1976). Investigations of this aspect of the human-environment relationship has been particularly

important to areas of psychology such as health, social behaviour, psychopathology and development, where issues of appraisal, stress and coping, risk perception, and place identity have been explored. Importantly, such considerations have also constituted the foundations for environmental psychology.

Environmental determinism is a doctrine that makes much of the constraint of environmental factors. At the extreme end of the spectrum, the strict environment-centred or environmentally determinist perspective holds the view that "a wide range of human behaviour is directly and entirely determined by the environmental circumstances within which the behaviour occurs" (Ittelson, 1976, p.52). Strict *environmental determinism* implies that the environment is the sole determinant of behaviour, the individual has no control, and psychology can explain nothing of importance concerning behaviour. Such a perspective arose out of the work of geographers in the 1920s, who used Darwinian evolutionary theory to suggest that the environment was the major determinant of evolution (Mannion & Bowlby, 1992; Moos, 1976). Psychologists such as Sells (1974a, 1974b), White (1959) and Berry (1980) adopted the principle of adaptation, which they considered an important concept for psychological inquiry into person / environment / behaviour. This essentially environmentally deterministic perspective suggests that human behaviour, as with other species, has the tendency to self-adjust to the environmental state. The basic assumption of the adaptation paradigm is that biological and psychological survival motivates behaviour (Saegert & Winkel, 1990).

10.3.3 Person x Environment - Centred Perspective

The *person-centred* perspective considers that person-centred factors are important determinants of behaviour. The *environment-centred* perspective affirms that environmental factors account for behaviour. A "real world" perspective, however, suggests that a more pragmatic approach would be a careful analysis of both the personal and the environmental parameters as they are encountered in the field or actual situation (Ittelson, 1976; Sampson, 1976). After all "people and situations are not logically independent of one another in the real world" (Walsh et al., 1992b, p.244). Ittelson et al. (1974) point out that, "We know, in fact, that we are neither captives of our environment nor do we stand outside of it, but, on the contrary, that we experience and contact it through active participation" (pp. 104-105). This essentially is an interactionist perspective which maintains that behaviour is a joint outcome of person and environment (Altman & Rogoff, 1987; Sampson, 1976).

The *person x environment* approach illustrates a practice now emerging in contemporary environmental psychology, "paradigm merging", where each perspective, as illustrated, emphasises a particular facet of the person-environment relation (Stokols, 1995). The *person-centred* perspective, for example, provides a valuable insight into intrapersonal factors. On the other hand, *environment-centred* perspectives provide valuable contextual information.

The early development of environmental psychology was directed by these perspectives functioning independently and in combination. The situationist theories accounted for "behaviour change in terms of the specific stimuli and events occurring within an individual's social and cultural environment" (Stokols, 1995, p.825). The interactional theories[3] on the other hand accounted for behaviour change in terms of intrapersonal factors such as perceptions, representations, understandings. Both of these are linear models, predicting behaviour changes from situational and intrapersonal factors and both provide powerful approaches to the study of certain environment-behaviour phenomena.

In contrast, transactional theories[4] emphasise the reciprocal or bidirectional nature of person-environment relations (Altman & Rogoff, 1987; Stokols, 1995; Wapner, 1995). The transactional perspective takes a holistic, dynamic approach to person-environment relationships, emphasising the study of process and change. Many saw transactionalism as a "theoretical foundation of the psychological approach to the person-environment relationship" which could alleviate the problem in investigation of "on the one hand too 'objectivist' and, thus, biased by 'environmental determinism', and, on the other, too 'subjectivist', that is, exclusively centred on the psychological phenomena in individualistic and intra-psychical terms, with scarce interest in extra-individual or 'contextual' factors in a collective or physical sense" (Bonnes & Secchairoli, 1995, p.153).

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[3] Refer to Section 2.3.2, Chapter 2 for details of this approach.
[4] Refer to Section 2.3.3, Chapter 2 for details of this approach.

10.4 The Present Study

10.4.1 Rationale, Research Focus and Aims

The present study derives from perspectives laid out so far. It seeks to better understand and conceptualise those features of human representations and transactions of particular salience to endangered species recovery and environmental management. While the study focuses specifically on *humans* , its aim is to address them, not in isolation from the encompassing systems of which they are an integral part, but rather to stress the importance of the holistic human-in-environment concept, a system operating as a unified whole (Wapner, 1995). The goal therefore is to provide a better understanding of the requirements of endangered species management, taking a holistic account of the *person* and the *environment* as they are framed in psychological theory.

Examining alternate ways in which individuals and communities represent and understand the natural environment, what they know about it, how this relates to environmental and social contextual factors, how all of this is framed in psychological theory, and how the resultant information can then be applied to the pragmatic needs of endangered species recovery, are the primary objectives of this exploratory study. These are some of the ways in which psychological research can be used to answer questions posed by environmental management. The process involves evaluating the usefulness of a number of conventional social psychological constructs in terms of theoretical advancement and understanding, the reasonableness of existing measures and procedures used to operationalise them, and their applicability to environmental management. In addition, as noted earlier, the study embarks on a "post hoc" assessment of the construct of environmental concern, including an examination of its relevance to environmental management, an investigation of conceptual and operational issues, and an empirical analysis of the data set. This assessment has been a product of the inquiry process itself which, through the exploratory analysis of conventional constructs and scales, has led to a re-evaluation of the notion of environmental concern.

The general aims of this human population study were:

1. To assess the attitudes, beliefs/values, concerns and information levels of three North Queensland communities toward cassowaries, wildlife, the natural environment of the Wet Tropics and global environmental and social issues. Particular emphasis is given to assessing information, salience, symbolic importance, concerns, values and attitudes, motivations and behaviours relating to cassowaries, cassowary conservation and cassowary habitat.

2. To compare and contrast the attitudes, beliefs/values, concerns, and information levels, of the rural community with those of the semiurban Mission Beach residents and a proximate urban sample, that of Townsville.

3. To examine possible interrelationships between attitudes, beliefs/values, concerns, information and behaviour toward the environment, wildlife and the cassowary, an endangered species of particular salience and significance to the Wet Tropics.

4. To evaluate the scales and items used in this research in terms of their utility as measurement and monitoring tools in the context of environmental management in North Queensland.

10.4.2 The Research Framework

This research framework summarises and consolidates the most important aspects of the theoretical perspectives presented so far in terms of the two primary explanation domains: *person* and *environment.* Key themes from each domain which require particularly consideration are as follows. Across the *person domain* three central themes apply. Firstly, humans are conceived as an integral part of the ecosystem. Secondly, their relationship with the environment is dynamic, interactive, transactional. According to this perspective, linear models of cause-effect are problematic and distorting (Altman & Rogoff, 1987). Thirdly, humans are considered as intentional, active agents in this interaction process.

Across the *environment domain*, again three central themes apply. The environment is conceptually and operationally defined in terms of *physical, social*, and *psychosocial* dimensions (Sampson, 1976). Firstly, objective aspects of the *physical* environment include landscape features, functional utilities and cassowary habitation and biology. These represent the array of ecological factors considered most salient to this study. Secondly, the *social* environment is defined in terms of population characteristics of the inhabitants including social characteristics, demographic variables, group membership characteristics, all of which are considered important situational factors. Thirdly, the *psychosocial* environment is defined in terms of perceptions, representations and understandings. The human component of the ecosystem is therefore considered in terms of a holistic formulation of person-environment interactions.

The underlying assumption in this inquiry is that the human system and human behaviour in particular is a complex function of variables related to the person on the one hand, and the environment on the other hand. In this research an emphasis is placed on developing a "broad-gauged, multiparadigm perspective" since this is considered most appropriate to

confronting complex environmental problems (Stokols, 1995), in this instance endangered species recovery.

The research is therefore premised on aspects of the situationist, interactional, and transactional models of person-environment relations drawn from social and environmental psychology (Altman & Rogoff, 1987; Bonnes & Secchiarolli, 1995; Stokols, 1995; Walsh et al., 1992a). These models offer a *general* theoretical formulation that serves the purpose of the holistic reciprocal interaction approach to the study of humans in situ. More *specific* psychological models such as the Composite Attitude-Behaviour Model (Eagly & Chaiken, 1993), the Underlying Belief/Value Systems Model (Dunlap & Van Liere, 1978, 1984), and the Environmental Concern Model (Reser et al., 1996; Stern, 1992) allow for a sharper, closer focus on particular variables and processes under investigation. In the organisation of this study, the theoretical and empirical analysis of respondents' representations and understandings of the natural environment begins at the *individual* level, primarily using the attitude concept. Two additional modes of understanding, that relating to information or knowledge, and understandings as reflected in actual behaviour are also included. The study then progresses through to a *community* or *social* level of analysis, with the emphasis on shared understandings such as underlying belief/value systems. Finally a construct that provides both *individual* and *community* perspectives, environmental concern, concludes this section. Details of these more specific theoretical formulations are presented in chapters 12, 13, and 14.

10.4.3 The Research Process[5]

Situating the human system component of this research within the context of the general aim of this dissertation, reciprocal ecosystem impact and interactions between humans and cassowaries, the present study investigates residents of three North Queensland communities; the rural community of Granadilla, the semiurban community of Mission Beach, and the urban community of Townsville, a city approximately 240 kilometres south of the rural and semiurban communities. This investigation involves a community survey which addresses a number of personal and situational factors such as the psychological, social and physical aspects of people's perceived and self-reported behavioural relationship with the natural environment. These included: (i) individual and community *psychosocial considerations* (e.g., general and specific attitudes, beliefs, values, concerns, information base, behaviour relevant to the natural environment, a range of environmental issues and concerns relating specifically to the cassowary, and

[5] Details of the research methodology are presented in Chapter 11.

shared beliefs/values and ideologies which relate to perceived rights, restrictions, and sanctions and perceptions of equality, equity, and justice); (ii) *physical environmental-contextual considerations* (e.g., landscape features, land use activity, cassowary habitation); and (iii) *social-situational considerations* of particular salience and consequence (e.g., demographic and social characteristics).

The key psychological and social variables selected for investigation were those which the social science disciplines suggest are most central to understanding human behaviour toward conspecifics and other species, namely general and specific attitudes, concerns, and motivations, with these constructs encompassing "knowledge", "beliefs", "emotions", and "values". As well, self-reported behaviour was considered an important albeit indirect measure of actual behaviour. Not withstanding this more conventional "social psychological" focus, the research reflects ten years of participant observation on the part of the author/researcher and a life time residence in the communities involved. Hence many direct observations of human behaviour and human-cassowary interaction have been made.

10.4.4 Dimensions of the Human System

10.4.4.1 Individual and Community Psychosocial Dimensions

Attitudes Attitude is a conventional psychosocial construct which has received considerable attention at both a theoretical and empirical level. Social psychology treats the attitude construct as an *individual* phenomenon and as such provides an individual level perspective of people's representations and understandings of the natural environment. In developing a relevant environmental attitude construct it was necessary to use the traditional psychological model proposed by psychologists such as Eagly and Chaiken (1993) and to map onto this framework existing and purpose-constructed scales that were particularly relevant to the content of this study. The resulting environmental attitude constructs used in this study were sufficiently encompassing yet specific enough for environmental management in general and endangered species recovery in particular. Environmental attitudes are discussed and research findings presented in Chapter 12.

Underlying Belief Systems and Value Orientations In the context of this research underlying belief systems, value orientations or world views are concepts used to provide a more global/general/social representation (Rockeach in Schwartz, 1994), a "shared" understanding (Doise, 1986), "unifying perception" (Ong, 1971), and

population-level perspective (Berry et al., 1992; Doise, 1986) of the world. As a global concept these *shared* understandings do not measure the subtle intra-individual psychological dynamics (e.g., Ajzen & Fishbein, 1980) of individual-environment transactions, but instead provide a cultural or societal framework in which individual-level transactions may possibly be anchored to ideologies and belief systems. An exploration of underlying community belief systems and value orientations constitute the focus of Chapter 13.

Environmental Concerns Concern for the environment is central to the environmental crisis. It is a term signifying that all is not well, it epitomises a dysfunctional system and is part and product of the human response to environmental degradation. Environmental concern is also seen as an important construct with which to frame the issues most relevant to an environmental management process which intends to operate at the human-environment interface. Furthermore, concern for the environment is considered as the "core motivational construct" for environmentally responsible behaviour - it is what ultimately motivates an individual or community to act (Reser et al., 1996). A focus on environmental concern, which provides both an individual and community perspective, is presented in Chapter 14.

10.4.4.2 Environmental-Contextual Dimension

Aspects of the physical environment investigated in the present study included features of the natural and built environment (Sampson, 1976; Wapner, 1995) such as landscape, functional utility, and cassowary habitation. This specified the local environmental conditions to which the respondents were exposed. Landscape features included proximity to natural environment, functional utility addressed issues relating to land use activity, and cassowary habitation described this species' use of the landscape. The analysis of these factors included biological field surveys, residents' community interview surveys, and aerial photographic interpretation. Results are presented in Chapter 11.

10.4.4.3 Social - Situational Dimensions

The population characteristics identified by Sampson (1976) that were most relevant to this present study included: (1) demographic variables such as age and gender; (2) social characteristics such as rural, semiurban, or urban residence, occupation, income, education; (3) group membership characteristics including number of group associations and types of group memberships. According to Sampson (1976) these indices of

characteristics identify the composition of participants in a setting which "is assumed to provide an array of stimuli that affects persons' behaving in that setting" (p.22). These population characteristics are presented in Chapter 11.

10.4.5 Conceptual and Operational Issues

It is important to note, at the outset, that the research and applied literatures of relevance to the environmental management issues of particular focus in this research cover multiple disciplines, discussions and concepts. While these discourses differ with respect to matters of practical and theoretical concern, they share what seems to be a common language and set of constructs with respect to human perceptions and response to the natural environment. In spite of widespread use and acceptance of constructs such as beliefs, values, attitudes, concern, knowledge, research and communications are still hampered by problems of definition and validity. Concerns about the theoretical fragmentation and conceptual diversity of these constructs are the major theme in Reser et al.'s (1996) review.

Conceptual agreement and consensus on the operationalisation of the constructs is problematic and makes valid measurement of such variables difficult. Details of the conceptual and methodological problems for each of the constructs under investigation in this research will be outlined in the chapters to come. For the moment, some passing comment on selected examples is necessary. Contemporary concepts of "attitude", for example, remain ambiguous in several respects even though it has been the basic construct used in the behaviour change psychological literature (Ostrom, 1989). The preferred sociological and social science construct has been "value". Many have simply used "environmentalism" as a term and construct which captures this attitudinal and value domain (e.g., Arcury & Christianson, 1993; Dunlap & Van Liere, 1984; Forgas & Jolliffe, 1994; Milbrath, 1984; Stern et al., 1993; Scott & Willits, 1994). Such a loose and encompassing construct is useful, but becomes problematic when there is the need to conceptually distinguish specific causal and mediating variables in a behaviour process model and when it is important to operationalise a particular component. What is also lost in this loose "environmentalism" conceptualisation are the separable cognitive, affective and motivational components of the attitude/value constellation. The ideological character of "world views" also underscores that we are dealing with complex belief systems.

Another ubiquitous problem in the conceptualisation and operationalisation of the constructs being addressed is language itself. It is acknowledged that many of the terms are used problematically and often synonymously with specific meaning and use varying

from researcher to researcher (Reser et al., 1996; Warren, 1993). Conceptual confusion is further exacerbated by the fact that these constructs are used in ordinary language and academic psychology concurrently (Blascovich & Tomaka, 1991). As Wells and Marwell (1976 in Blascovich & Tomaka, 1991) point out, "common-language notions ... are sometimes substituted for more precise, explicit, scientific definitions, creating the illusion of a universally accepted, well-defined, phenomenological entity" (p.116).

There is therefore a clear need for the researcher to be particularly careful and clear about terminology, the nature and reference of the constructs used, and the precise meaning of the empirical questions being explored.

Chapter 11

Target Communities and Methodology

11.1 Introduction

Research which attempts to capture the complexities of the environment, the human community, and individual responses must adapt and adopt methodologies which will accomplish this, while at the same time obtaining quality and precision data. However, when developing a research strategy which attempts to adequately reflect the relevance and complexity of environmental problems - "real world" problems - many issues need to be considered. This chapter outlines the process of developing and applying a research methodology appropriate to the present study which focuses on "real world" problems.

11.1.1 Chapter Outline

An overview of methodological considerations such as research relevance, multiple perspectives, and levels of analysis is first presented. This is followed by details of how this research addressed such methodological considerations and applied them to the naturalistic setting. Details of the general survey area, the study communities which are located within this area, and the residents of these communities are then outlined. The chapter goes on to describe the research design, presenting details of the rationale behind the interview survey approach and outlines the research sequence of this component of the dissertation. An overview of analyses and methodological issues concludes the chapter.

11.2 Overview of Methodological Considerations

11.2.1 Research Relevance

The primary goal of this research was to provide information that was *relevant* to understanding current environmental problems. A "problem-centred" (Stern & Oskamp, 1987; Stern et al., 1992), "problem-oriented" (Altman, 1976; Bell et al., 1990, 1996; Bonnes & Secchiaroli, 1995; Oskamp, 1984), or "problem-focused" (Proshansky et al., 1976) approach was therefore adopted; an approach primarily concerned with providing information to practitioners - those in the field who need to deal directly with the problem through decision-making or policy-making processes (Stern & Oskamp, 1987; Oskamp, 1984). In adopting such an approach the researcher "seeks to solve these problems using critical underlying assumptions as to the best way this can be done. It is assumed that out of the analysis and systematic study of these problems, as they develop and unfold in the

context of everyday life, there will emerge the empirical generalizations necessary to solve them" (Proshansky et al., 1976, p.10). The research strategy was therefore directed toward gathering information on a range of actors, actions, constructs and settings that were particularly *relevant* to the environmental problem under investigation, the endangerment of a species.

11.2.2 Multiple Perspectives

In order to pursue this "problem-centred" approach, *multiple perspectives* were inevitable as outlined by Stern and Oskamp (1987), "a problem-centred approach is inevitably interdisciplinary - it stimulates researchers to draw on theories and variables from various subdisciplines of psychology and even from other disciplines" (p.1050). Therefore, the conceptualisation and measurement of the many variables explored required an interdisciplinary perspective, spanning several social and natural science disciplines. In addition, the very identification of the extent and nature of the problem, its potential causes, and the development of suitable intervention and research strategies required an exchange between a number of disciplinary sectors, in particular biology/ecology, social and environmental psychology, and environmental management.

Exploratory field research began by clearly specifying the problem that had to be addressed (Ittelson et al., 1974) using several disciplinary-specific theoretical concepts and models as guidelines. The specification and sampling of the human population raised its own problems and challenges, particularly when attempting to define residence in terms of land use. Stern et al. (1992) presented the case for an interdisciplinary conceptualisation of land use which was most appropriate to this study, "a land taxonomy must be sensitive to the biological and physical characteristics of a particular land use, such as species diversity that typically accompanies it, its albedo, and its perculation rate. But the taxonomy must also be sensitive to the economic function of the land use, its political regulation, and its cultural meaning" (p.212).

11.2.3 Research Setting

Clearly the nature of the environmental issues under investigation in this study required a *naturalistic* or *real world* field setting as opposed to a *laboratory* field setting (Lincoln & Guba, 1985; Mandel, 1984; Oskamp, 1984; Proshansky et al., 1976; Winkel, 1985). In addition, of concern was understanding the phenomenon under investigation as a dynamic

and changing set of environmental and human systems. Both context and setting were therefore important methodological considerations.

Altman and Rogoff (1987) define contexts and settings as including "the qualities of the physical and social environment that may be psychologically relevant, the nature of tasks and instructions, the flow of events, how the setting relates to other aspects of a person's life, the "meaning" and interpretation of the situation by participants, and the familiarity of the participants with the setting" (p.33). In the real world field setting of this study environmental occurrences and conditions were not manipulated nor were the subjects involved, prescribed. Although there are criticisms of this methodology in terms of questionable internal validity[1], external or ecology validity [2] is maximised (Mandel, 1984; Streufert & Swezey, 1985; Winkel, 1985). Furthermore, "naturalistic" methods make it possible to use "externally valid scientific information to understand and improve the environment in which we must survive" (Streufert & Swezey, 1985, p.111).

11.2.4 Multiple Levels of Organisation/Analysis

Human responses to environmental problems are known to occur within several interacting systems (Stern et al., 1992), involving a multiplicity of subissues (Yaffee, 1994b), which requires *multiple levels* of scientific analysis. Since the focus of this research was the exploration of these human responses, multiple levels of organisation and analysis had to be addressed, and the information generated interpreted and integrated. The conceptual mapping of these different levels of analysis therefore became an important methodological consideration.

11.2.4.1 Person-Environment [3]

The minimal levels of organisation and analysis which must be considered in the person and environment component of the person-environment relationship, are the objective physical, the social-situational, and the psychosocial.

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[1] i.e., whether an observed relationship between two or more variables represents a "real" finding, or whether it was caused by spurious variables not taken into account by the investigator (Mandel, 1984).

[2] i.e., the extent to which the results can be generalised from the context in which the study was done to other contexts; populations, settings, and times (Mandel, 1984).

[3] Since levels of organisation of person and environments have been detailed in the previous chapter, just a summary note is included here.

11.2.4.2 Individual - Community

The *individual* level of analysis, intra-individual processes, essentially involve psychological explanations of psychological phenomena - the characteristic domain of psychology. The focus here is on "the individual, the mind, the mental or psychological processes as self-contained phenomena, with environments and contexts playing a secondary or supplementary role" (Altman & Rogoff, 1987, p.11). At this level, the developing and behaving individual is seen to be influenced by psychological characteristics including beliefs/values, attitudes, concerns, motivation, and behaviour; "in -the-head" phenomena. Theories relevant to this level describe the mechanisms of organisations of these individual representations and understandings (Doise, 1986). Inter-individual processes involve the above psychological phenomena occurring within a given social or interpersonal situation at a given time (Taylor & Johnson, 1986) and relationships between individuals are the focus of analysis (Doise, 1986).

In contrast, the *societal* or *community* level of analysis is concerned with describing, analysing, and understanding features of populations or groups (Berry et al., 1992), "shared understandings" where individual understandings becomes shared understandings (Doise, 1986), where understandings reflect a universal public perception. This level of analysis involves social, cultural and ecological explanations of phenomena (Taylor & Johnson, 1986). Influences on the individual are variables of sociopolitical, cultural, and ecological context. In the more pragmatic context of environmental management, this societal level of analysis becomes the local "community". Focusing on aspects of shared perspectives and understandings provides an alternative perspective to the exclusively individualistic approach (Bonnes & Secchiaroli, 1995).

11.2.4.3 Specific - General, Local - Global

Previous environmental research has often been criticised for an exclusive focus on either *specific* attitudes as *general* values, or *local* knowledge as *global* awareness. Given that environmental transactions must reflect both the *general* and the *specific* , and the *local* and the *global* (Eagly & Chaiken, 1993), these levels of analysis were an important methodological consideration in this research. Enlightened environmental management must be aware of underlying and shared beliefs and values, and as well target specific knowledge, attitudes and concerns. In addition, this issue of the *generality* versus the *specificity* of the variables (i.e., the compatibility of measures), is considered to be very important in terms of inter-variable relationships, for example, attitude-behaviour

correlations (Ajzen, 1989; Ajzen & Fishbein, 1977, 1980; Eagly & Chaiken, 1993; Schuman & Johnson, 1976). According to these researchers, variables/constructs should be defined at an equivalent level of generality (or specificity) in order to more accurately assess attitude-behaviour correlations.

The local/global distinction can map onto the specific/general dichotomy, and it can relate to an actual spatial scale of analysis. Stern et al. (1992) suggest that studies that include global and local scales are,

> "...designed to assess the possibility that critical human-environment relationships, and the identity of the most important variables affecting that relationship, may vary with a spatial scale of analysis... Although in some instances, local or regional concerns will parallel the global, in others, nested sets of explanations will be required that fit local conditions to the regional and the regional to the global. These types of connections must be articulated to understand the human dimensions of global change" (p.108).

However, Dower (1994) expresses the need for caution when making the local/global distinction, one he believes is more accurately described as a continuum from the very local (in-my-backyard) to the whole world (climate change) with many levels in between. Determining the spatial boundaries will depend on respondents' objective assessment (cause and effect) and subjective assessment (perception of their 'significant milieus'-'field of significance'). "Thus environments as fields of significance will vary considerably from person to person, from one group to another" (Dower, 1994, p.148).

11.3 Survey Area and Communities

11.3.1 Survey Area

The survey area is situated in the tropical region of North Queensland. The Wet Tropics component of this region was inscribed on the World Heritage list in December 1988. The area includes 900 000 hectares of rain forest [4] and extends 450 kms from south of

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[4] Rainforest represents 1.9% total forest and woodland area in Australia according to 1988 figures, and 0.27% of total Australian land area (Frawley, 1991). For 1996 this would be considered an overestimate since clearing has continued since 1988. IUCN 1991 estimates of tropical rainforest in Australia is 0.01 million square kilometres which represents 0.08% of world total (WTMA, 1992).

Cooktown to north of Townsville (WTMA, 1992, 1995). The IUCN 1991 worldwide estimates of the deforestation of tropical rain forest was over 12 million hectares per year (WTMA, 1992) which further emphasises the importance of the preservation and careful management of these 900 000 hectares. The Wet Tropics of North Queensland is Australia's tenth such listing and the third in which rainforest is the main or significant component.

Human settlement of the Wet Tropics region has a history of at least several thousand years. Occupation of the region by a distinctive rainforest Aboriginal group is dated at 5,100 years from the limited archaeological research which has been done to date (Horsfall, 1991). However, Horsfall suggests that Aborigines may well have lived in the region for 40,000 years, the estimated time of their first arrival in Australia (Berndt & Berndt, 1992; Horsfall, 1991). Today, Aboriginal people are scattered throughout the Wet Tropics region in small communities, a legacy of the post-contact resettlement policy. This "relocation of Aboriginal people irreversibly altered the integral relationship between language, land and identity" (Schmidt, 1990). Nevertheless, an appreciable amount of the distinctive "rainforest people" identity is still maintained in this region (Toohey, 1994), and is now experiencing a cultural resurgence (Horsfall, 1991). European settlement of the region dates from 1869 (Frawley, 1991). Associated with this 130 years of settlement has been considerable irreversible modification of the landscape and its native inhabitants. Today the region is occupied by more than 300,000 permanent residents, a population which increases dramatically with the 4.77 million tourists who visit the region each year (WTMA, 1996).

The nomination of the Wet Tropics for World Heritage listing was not without considerable controversy (Doyle & Kellow, 1995; Frawley, 1991). It was strenuously opposed by State Government at the time[5], bringing into the spotlight a State versus Commonwealth rights issue. It was also opposed by many of that government's supporters - regional and predominantly rural constituents and the forestry industry whose interests dominated Queensland politics. This focused the debate on the preservation of natural forests versus traditional forestry and agricultural practices. In addition, controversies were embedded in a history of conflict in the management of North Queensland forests. Frawley (1991) has identified three phases in rainforest management in North Queensland, two of which are strongly linked to a utilitarian philosophy. The first phase (1869-1890) included "simple exploitative pioneering"; rainforest was valued for agricultural potential and timber. The second phase (1890-

[5] A National Party conservative government which held office for 32 years.

1960) involved a long period of conflict between land use for a "closer settlement" policy[6] and forestry requirements. According to Frawley, the closer settlement policy "was seen as a way of decentralizing population against the threat of both the "yellow" and "urbanization" perils. A Board of Inquiry into the sugar industry in 1916 stated that the "primary object" in considering 'expansion of the sugar industry is to assist in the settlement of our Northern land by people of our own race'" (Queensland Parliamentary Papers 1916-1917, in Frawley, 1991, p.229). Post-1960 saw the beginning of the third phase in which the Forestry industry was now in conflict with an increasing awareness and concern for the environment, leading to the preservation of the remaining rainforest and the complete halting of logging. World Heritage listing in 1988 was the culmination of this campaign. The area is now managed by a number of federal, state, and local government agencies. The Wet Tropics Management Authority fulfils a coordinating and monitoring role of management activities (WTMA, 1992, 1995, 1996). Other principal environmental management agencies of the Wet Tropics region include: the Department of Environment, which is responsible for nature conservation; the Department of Natural Resources, responsible for managing state forests, timber reserves and water resources; and the Department of Lands, responsible for managing land titles (freehold, leasehold, vacant Crown land).

11.3.2 Survey Communities

Within the tropical region of North Queensland three communities were selected for this research (Figure 11.1); two were located within the Wet Tropics region, bordering on to Wet Tropics World Heritage Areas, the rural (Granadilla) and semiurban communities (Mission Beach). The third was located outside and approximately 50 kms to the south of the Wet Tropics region, the urban community (Townsville).

Many respondents from the two communities within the Wet Tropics region have been long associated with the controversy of World Heritage Listing. Many would have opposed the listing, fearful that it meant the end of jobs particularly in the timber and mining industries, restrictions on land use particularly in the rural and coastal communities, and a general animosity against Commonwealth Government intervention (Doyle & Kellow, 1995; Trott, 1996). In addition, Frawley (1991) argues that the particular location and historical experience of residents of this region can be linked to the

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[6] This policy involved the opening of rainforest land to selectors for small farms such as dairy and sugar cane resulting in the almost entire removal of the original forest, e.g. Atherton Tableland (Frawley, 1991).

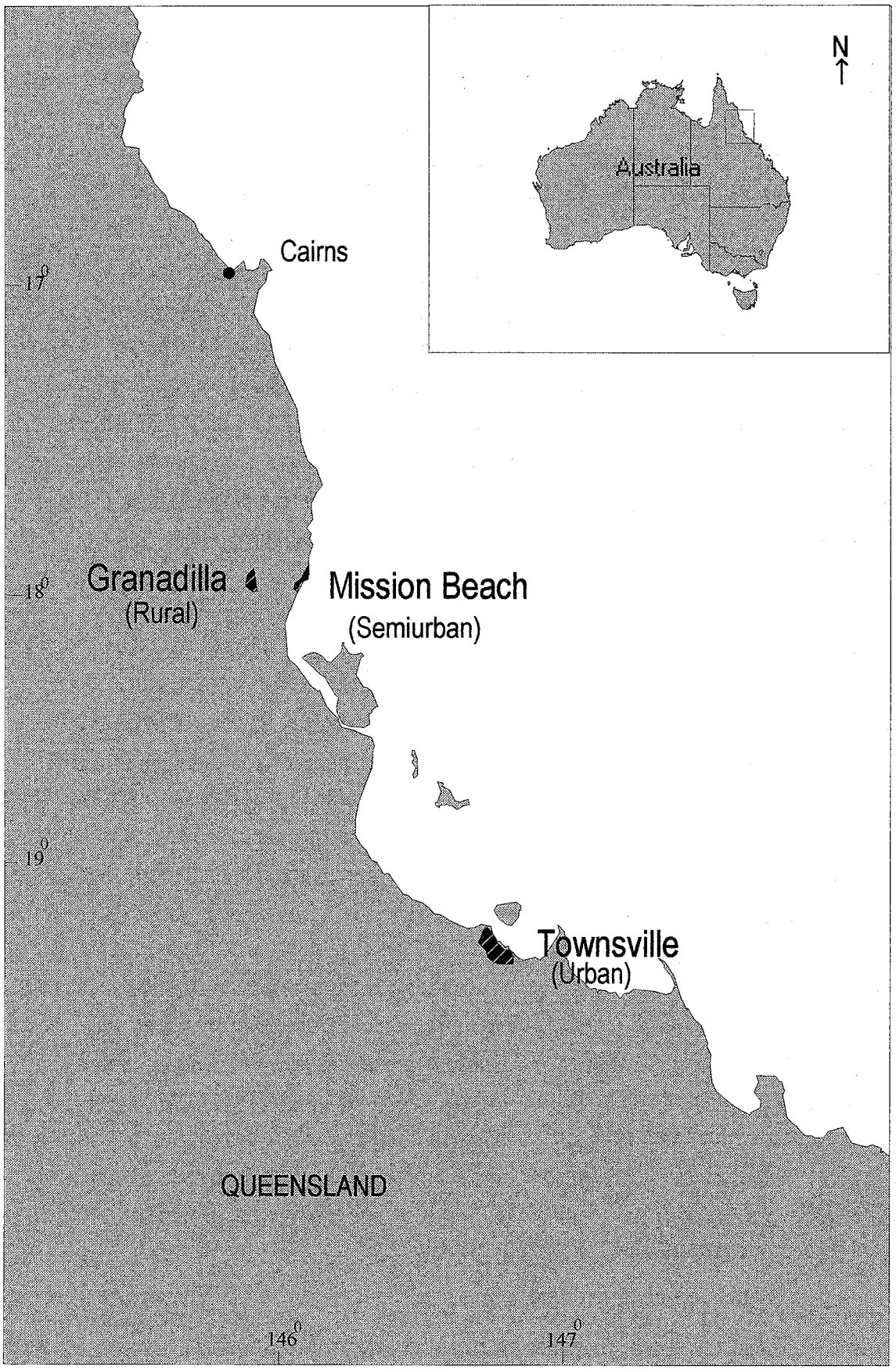

Figure 11.1 Map showing the location of the three survey communities.

development of a set of pioneering frontier attitudes still present today and still having an influence on resource management. However, the substantial influx of new residents in the region as a consequence of tourism may well be altering this situation.

11.3.2.1 Rural Community - Granadilla Valley

Granadilla Valley is located in the Wet Tropics region (Johnstone Shire) directly west of the coastal settlement of Mission Beach. It lies within the north-eastern and western slopes of the Walter Hill Range. The El Arish-Mission Beach Road and the Bruce Highway forms the north-eastern, northern and north-western boundaries to this valley. This rural survey area covers approximately 44 km^2 of which approximately 3.5 km^2 is Wet Tropics World Heritage State Forest and the remaining 40.5 km^2 is privately owned or leased. An extensive boundary exists between Wet Tropics World Heritage (Tam O'Shanter) State Forests and sixteen privately owned and/or leased properties.

Landscape Features and Land Use Activity A biological field survey was conducted in this valley in January and February 1993 (Bentrupperbäumer, 1993). The valley is typical of lowland rural communities of the Wet Tropics region in that a variety of agriculturally-based land use activities occur which have resulted in a greatly modified landscape over time. The most important of these activities include sugar cane farming, which occurs on 64% of the agriculturally productive land. Cattle grazing and tropical fruit farming occur on the remaining 36%. This land use activity has reduced vegetated areas considerably, the majority of which now remain restricted to above the 40m contour or along water courses and low lying areas.

Cassowary Habitation In these remaining forested areas the topography and soil associations have resulted in a complexity of vegetation types favoured by a number of wildlife species, including the cassowary. The minimum adult cassowary population estimate for this survey area was twenty-five (Bentrupperbäumer, 1993), confirming the habitation of many of these private and leasehold lands by cassowaries. Although this habitation has now been restricted to the forest fringes and watercourses, many of the human inhabitants of this valley have sighted cassowaries either on their properties or elsewhere within the valley.

11.3.2.2 Semiurban Community - Mission Beach

Mission Beach is located along the coastal fringe five kilometres east of the Granadilla Valley. This long, narrow, coastal community is situated between the Hull River to the south, Ninney Point to the north, and those sections of the Walter Hill Range which includes Double Mt. and Clump Mt., to the west. The Johnstone - Cardwell Shire boundary intersects in an east-west direction dividing the area into a northern Johnstone Shire and a southern Cardwell Shire portion. This survey area covers approximately 44 km^2. All of the western boundary of this coastal strip is the World Heritage forests of Tam O'Shanter and Hull River.

Landscape Features and Land Use Activity The urbanisation of this coastal fringe is also fairly typical of the Wet Tropics coastal developments - ribbon style developments determined by geographic features of the landscape such as the coastline and bordering hills. The impact of this development and the scattering of agriculture have also considerably modified the landscape over time. Within the larger Mission Beach community lay four relatively contained smaller communities, South Mission Beach, Wongaling Beach, North Mission Beach and Bingil Bay. Each of these are divided by Reserve Crown lands which maintain the continuity of forested corridors, though narrow, from the coast to the World Heritage forest massif to the west. These two features determine the semiurban nature of the development with urbanisation, farming and the natural environment still in close proximity.

Cassowary Habitation Biological field surveys were conducted in six Reserve Crown Land areas of this coastal region in 1990, 1991 and 1992 (Bentrupperbäumer, 1991, 1992a). In addition, cassowary monitoring had been established in the region since 1986 (Bentrupperbäumer, 1988, 1992b). From both these sources of information a minimum population estimate of fifty-four adult cassowaries was established (Bentrupperbäumer, 1993). This population of cassowaries was known to utilise the remaining forested fragments and urban-forest fringes of this entire region, interacting on a regular basis with the human inhabitants.

11.3.2.3 Urban Community - Townsville

In contrast to the above two communities, both of which have the proximity of the natural environment and in particular the cassowary population in common, Townsville is relatively distant from these features. The large urban sprawl of Townsville ensures that many suburbs have limited contact with the natural environment. In addition, the natural

environment which surrounds the city is largely outside the Wet Tropics region. Due to a lower rainfall [7] this natural environment is considerably less complex and diverse than the Wet Tropics region and unsuitable for cassowaries. The city is typical of Queensland coastal urban communities in that the major land use activity is high density residential and commercial development surrounded by urban sprawl, which in turn is surrounded by the natural environment. The closest cassowary habitat to Townsville is the Wet Tropics area of Paluma Range, approximately 50 km to the north.

11.3.3 Sampling Frame

While theoretical models provide a clear logic to survey sampling, the skill of sampling lies in the ability to apply these models to the less-than-perfect conditions that are present in the field (Babbie, 1990; de Vaus, 1985). Very often field conditions require the adoption of flexible investigative strategies (Winkel, 1985), and a compromise with regard to theoretical conditions and assumptions (Babbie, 1990). This section outlines the rationale for choosing the sampling frame and methods used for sample selection.

One of the social or contextual variables under investigation in this study, and one frequently "encountered in debates over the conservation, protection, and management of biological diversity" (Kellert, 1996, p.57), is resident or community group status (e.g., Black & Reeve, 1993; Cox et al., 1985, 1988; Curtis & De Lacy, 1996; Duff et al., 1992; Fortmann & Kusel, 1990; Jones & Dunlap, 1992; Lynne & Rola, 1987; McEachern, 1992; O'Connell & Noss, 1992; Samdahl & Robertson, 1989).

Primarily for pragmatic reasons, in this study residential groups were first identified according to a distinct locality. Associated local level landscape structure made possible a clear distinction between "rural", "semiurban", and "urban" communities. However, type of residential community can also be an informative index of the nature and extent of resident contact with the natural environment. Differentiating between the residents according to land use, the "extent of dependency on the land and its resources for a livelihood" (Kellert, 1996, p.57) was clearly of interest. Linked to this land use is residents' degree of interaction with their immediate environment and their potential for impact on that environment (see for example, Cosgrove et al., 1994; Wargo, 1988). Such an interaction involved the land use activity occurring on place of residence, and the nature and extent of that activity (e.g., identifying agricultural activity, income

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[7] Annual mean rainfall for the Townsville region ranges from between 600 mm to 1,500 mm compared to 1,200 mm to 4,000 mm for the Wet Tropics region.

dependency on this activity, size of the property). Kellert (1996) found such factors were important indicators of rural/urban distinctions:

> Farmers, people who own large amounts of land, and those residing in open country areas express far more pragmatic (and less protectionist) attitudes toward nature and animals than do residents of large cities, people who own little or no land and, the college-educated (likely to be engaged in urban-white collar professions), and young adults. Rural-oriented groups tend to endorse people's right to exploit and master nature; urban and suburban young and better educated people express greater concern for the protection of wildlife and natural habitats. (p.57)

Type of residential community can also be an informative index of the nature and extent of resident contact with particular species in the natural environment. As the target species of concern in this research was the cassowary the resident's co-existence with this species was a consideration. This was identified through biological field surveys conducted in the rural and semiurban communities, and recordings by residents of the time frame, nature and regularity of their contact with this species. This would confirm the extent to which cassowaries inhabited these landscapes and the awareness of the resident groups of their presence in the immediate environment. A final consideration was the actual physical linkage of these communities to World Heritage listed forests. For these reasons, "type of community", i.e., the rural, semi-urban, and urban status of a community contributed a convenient sampling frame for choosing three proximate but different North Queensland communities which would cover a reasonable spectrum of everyday contact and involvement with the natural environment (see Table 11.1).

The rationale associated with this particular consideration and definition of sampling resident groups within the spatial realms rural, semiurban, and urban is also linked to the process of environmental management, decision making, consultation, and policy development and implementation, particularly in relation to endangered species recovery. Information about resident community-natural environment relationships is especially relevant to this process (Kellert & Clark, 1991; Kellert, 1996; Reading, 1993). Previous research has indicated that rural residents are more likely than semiurban and urban residents to have an orientation toward the natural environment that is primarily utilitarian because of their involvement with "extractive" occupations such as farming (Van Liere & Dunlap, 1980; Kellert, 1996). Rural residents, with their substantially larger land holdings than the semiurban or urban residents, have the potential to inflict the greatest impact on endangered species survival simply through habitat degradation associated with the nature of their extractive occupations (Buckwell, 1989).

Table 11.1 Classification of resident communities.

Resident Community	Location	Criteria
Rural	Granadilla Valley	a) a community in which a combination of agriculturally-based land use activities occur in close proximity to and/or incorporating the natural environment. b) a community interacting with the natural environment, in particular cassowaries. c) an environment known to be inhabited by cassowaries. d) an area within the Wet Tropics region of North Queensland.
Semiurban	Mission Beach	a) a community in which the land use activity is predominantly urban development in close proximity to and/or incorporating the natural environment. b) a community interacting with the natural environment, in particular cassowaries. c) an environment known to be inhabited by cassowaries. d) an area within the Wet Tropics region of North Queensland.
Urban	Townsville	a) a community in which the land use activity is predominantly urban and commercial development **removed** from the natural environment. b) a community which is **not** regularly interacting with the natural environment and in particular cassowaries. c) an environment **not** inhabited by cassowaries. d) an area **outside** the Wet Tropics region of North Queensland.

A dependency on the use of the natural environment by rural residents and the expectations of speculative landowners of significant economic returns is assumed to influence landholders' acceptance of environmental management policy, in particular restrictions and regulations (Beatley, 1994). The individual landholder and his/her decision-making about the environment he/she owns or manages are major forces shaping the physical (O'Connell & Noss, 1992; Wilson, 1993), social (Haymond, 1990), and political landscape (Cox et al., 1985; Frawley, 1992; Sheail, 1995).

On the other hand, there is the resident community which is far removed from this type of dependency and the day to day interaction with the natural environment, the urban sample group. Amongst these are the potential tourists and vicarious users of the environment, those who have an equally valid reason to be considered in the decision and policy-

making processes, but a group which brings a very different perspective to this process (Reser et al., 1996). In between these two groups are residents of a rapidly developing, tourism-dependent small-town, the semiurban sample group. This sample group is assumed to be highly growth oriented, a group which also has a utilitarian orientation towards the natural environment, but one that differs from the rural residents in that it is tourist-oriented. Community development and growth within the region is in direct conflict with many environmental conservation concerns and values, in particular the survival of the cassowary (Crome & Bentrupperbäumer, 1993). Land speculation for expanding residential subdivisions and major tourist developments is the major force behind habitat degradation on the coastal fringe which is essentially the semiurban community. The resolution of endangered species conflicts, and the development and implementation of endangered species recovery programs must consider the variety of individual and interest group perspectives - the "stakeholders" (Beatley, 1994).

A sampling frame such as that just outlined does not, of course, ensure representativeness of the North Queensland population, but it clearly samples a reasonable diversity of respondents' environmental representations and understandings. Kellert (1996) notes:

> Effective conservation of nature will necessitate a balanced consideration of both (all) viewpoints. Differences among rural and urban dwellers often reflect legitimate perspectives, but sometimes they also reflect bias and intolerance. Wildlife managers must strike a balance between the interests of all stakeholders, regardless of residence while minimizing their distorted view toward the natural world. (p.59)

The consideration and definition of resident communities according to the criteria outlined is clearly different from the social psychological approach to defining residence in terms of "social representation of space" (Halfacree, 1995). Such an approach draws on the work of Moscovici and presents residence as an organised mental construct of abstract concepts and concrete images. According to Halfacree (1995), the advantage of such an approach is that it "allows the researcher to build-up a definition of the rural (semiurban, urban) from individual respondents, instead of attempting to fit empirical material to our presuppositions of what rural is" (p.4). This approach, however, was not considered entirely appropriate in this research context since there are specific attributes of the physical place of residence, as outlined, which are important to aspects of the environmental management process. Nevertheless, social representations of space/place of residence do have an important role to play in such research. Rather than defining 'rurality' or 'urbanality', this construct has been applied to exploring respondents' representations of self/human-natural environment relationships.

Finally, it should be emphasised that community type was not conceptualised or operationalised as a sociological or structural parameter of particular significance; rather type of community simply served as a convenient sampling frame for selecting three particular communities and operationalising the extent of contact and involvement with the natural environment and cassowaries in a particular.

11.3.3.1 Rural Residents

The rural community consisted of all occupied households identified from aerial photographs and then ground verified. The current permanent resident adult population was estimated to be below 80, occupying 40 households. All of the 40 known occupied households were approached. Thirty-seven interviews were conducted in 29 (72.5%) of the households of which 35 were adequately completed. Of the 11 households which did not respond to the survey, seven (17.5%) were not at home at the time of the survey, in two (5%) the occupants were not interested, and in the remaining two (5%) the occupants were either too old or too sick to participate.

Land Use Activity For the 35 rural respondents the size of the property on which they lived ranged between 10 and 600 acres, (average size = 200 acres). Thirty respondents (85.7%) identified some form of agricultural activity occurring on their property. For 22 respondents (62.9%) this agricultural activity provided a source of income; for 17 (48.6%) it provided the primary source of income; for the remaining five respondents agriculturally based incomes were supplemented with teaching, clerical work, and labouring.

Cassowary Habitation - Direct and Repeated Experience All 35 respondents recorded having seen a cassowary in the wild; 21 respondents (60%) had recorded sighting them at least every two months. This same number of respondents had sighted cassowaries within their region in the same month of the survey. All respondents had recorded sighting a cassowary within the last year, April 1993 to April 1994.

This profile confirms the rural status of the respondents according to criteria (a) and (b) of the classification schedule (see Table 11.1). Criteria (c) and (d) have been confirmed in Section 11.2.2.1.

11.3.3.2 Semiurban Residents

The semiurban community consisted of all permanently occupied households within the boundaries outlined in Section 11.2.2.2. In order to compile the most reliable sampling frame, two methods were used. For the Cardwell Shire portion of the survey area, access to the Shire's Property Valuation computer files (available for public viewing) was made. This provided information on all properties within the Mission Beach section of the Shire. From this it was possible to identify those properties which were owner-occupied, those with houses - occupation status unknown, and vacant land. With the aid of this information and detailed cadastral maps, confirmation of the sampling frame was obtained by physically surveying the whole of the semiurban survey area. Since the survey relied on respondents being permanent residents of the community, only households which were occupied were included; unoccupied houses and holiday units were excluded. The sampling frame was then sorted into street names in alphabetic order. When available, house numbers were recorded in ascending order and located on maps, and when numbers were not present code numbers were given together with unique descriptions. Once in this final form, each household was given a unique number. A random sample of 100 households was then drawn from this final sampling frame. Due to the efficiency of the administration of the survey this random sample was exhausted soon enough to allow for additional sampling. A stratified sampling technique was then included to increase the sample numbers.

A total of 222 randomly selected households in this semiurban community were approached for the survey. One hundred and forty-seven interviews were conducted in 115 (51.8%) households, 143 of which were completed. This represents approximately 23% of the total permanent adult (above 15 years) population of this area (Australian Bureau of Statistics, 1991). Of the remaining 107 households, 53 (23.9%) were not at home, for 17 (7.7%) the time was inconvenient, the occupants of 33 (14.9%) were not interested and four (1.8%) could not participate due to language difficulties.

Land Use Activity For the 143 semiurban respondents the size of the property on which they lived ranged between 0.2 and 6 acres. The majority of respondents (70.6%) were living on household blocks less than one acre in size. Ninety seven percent of respondents acquired their income from occupations other than farming; 25% of respondents were retirees.

Cassowary Habitation - Direct and Repeated Experience Ninety seven percent of respondents recorded having seen a cassowary in the wild within their region; 61.6% had recorded sighting them at least every two months; 48.3% had sighted

cassowaries within the region in the same month of the survey; 93.7% had sighted cassowaries within the year prior to the survey.

This profile confirms the semiurban status of the respondents according to criteria (a) and (b) of the classification schedule (see Table 11.1). Criteria (c) and (d) have been confirmed in Section 11.2.2.2.

11.3.3.3 Urban Residents

Due to the large population of this urban community, the considerable area it covered and the limited resources available to conduct the survey, a stratified sampling technique was used to determine the community sample. The population was stratified according to socio-economic status. Six suburbs of Townsville known to represent a range of socioeconomic groups were identified, with these forming the sampling frame. Within these suburbs, streets were selected in a systematic but unbiased way, which allowed for dispersed but individually contiguous areas to be selected. The survey sample included each permanently occupied house along the course of the street in either ascending or descending order of house numbers depending on which end of the street the survey administrators started from. A minimum sample of 100 was required; a total of 150 survey instruments were available. The survey instrument for Townsville was modified slightly to ensure that some items were meaningful in the context of an urban residential community.

A total 619 households from six inner-city suburbs were approached. One hundred and forty-five interviews were conducted in 113 (18.3%) households with 142 completed. This represents approximately 2% of the total adult (above 15 years) of the Townsville city area (Australian Bureau of Statistics, 1991). Of the remaining 506 households, 250 (40.4%) were not at home at the time of the survey, for 165 (26.7%) the time was inconvenient, the occupants of 76 (12.3%) were not interested, four (0.5%) could not participate due to language problems and at eleven houses (1.8%), dogs prevented entrance.

Land Use Activity All of the 142 urban respondents were living on suburban household blocks of less than one acre in size.

Direct Experience with Cassowaries Sixty-four percent of respondents recorded having seen a cassowary in the wild, all within the Wet Tropics

region; one person had recorded sighting a cassowary in the same month of the survey; 21.7% had recorded sighting them within the year prior to the survey.

This profile confirms the urban status of the respondents according to criteria (a) and (b) of the classification schedule (see Table 11.1). Criteria (c) and (d) have been confirmed in Section 11.2.2.3.

11.3.4 Population and Social Characteristics of Respondents

Various factors related to the characteristics of individuals inhabiting a particular environment, for example, population and social factors, are considered as situational variables in that they partly define relevant characteristics of the individual's social environment (Moos, 1976; Sampson, 1976). Summary information of selected population characteristics relevant to the above survey respondents is outlined. Further details are presented in Appendix B.1.1.

11.3.4.1 Demographic Profile

Gender The respondent population was made up of 140 (43.7%) females and 180 (56.3%) males who were evenly distributed across resident communities.

Age The age range of respondents was 15 - 82 years with a mean of 41.72 (SD = 15.87). Respondents differed significantly by resident community on age. Urban residents had a significantly lower mean age (36.21 years) than did semiurban (46.37 years), and rural residents (45.46 years) [$F(2,314; n = 316) = 17.13$, $p = 0.0001$; Fisher's PLSD]. They were, on average, ten years younger than their semiurban and rural counterparts (see Appendix B.1.1. for details). This clearly presents some problems with respect to group comparisons which are discussed in the context of the presentation of findings.

11.3.4.2 Social Profile

Education The highest level of education obtained by the majority of respondents was either secondary level (40.6%), or university level (31.1%). Level of education differed between resident communities [χ^2 (6, n = 318) = 39.6, p = 0.0001 (Cramer's V = 0.25)]. Education level was significantly higher among urban residents

than semiurban and rural residents (see Appendix B.1.1 for details). Again, this has important implications for the interpretation of group differences which are discussed later.

Income The average family income for the majority of respondents (24.3%) was between $20,000 and $29,999 per year. Group comparisons indicated that income level differed amongst communities [χ^2 (10, n = 292) = 31.96, p = 0.0004 (Cramer's V = 0.23)]. Urban residents reported a significantly higher family income than semiurban residents, possibly reflecting the high retiree population of the semiurban community (see Appendix B.1.1 for details). Forty percent of respondents with incomes below $20,000 recorded their occupation as retired/pensioner.

Length of Residency Years of residence, i.e., number of years living in the community, was greatest for rural residents. Their 17.71 years (SD = 15.58) on average well-exceeded the 9.73 (SD = 12.26), and 7.71 years (SD = 12.61) of the semiurban and urban residents [F(2,313; n = 315) = 8.16, p = 0.0004; Fisher's PLSD] (see Appendix B.1.1 for details).

11.3.4.3 Group Membership Profile

Membership versus Non Membership Thirty-three percent of the survey population belonged to either a community or business organisation. The majority, 67%, remained without group membership. No significant difference in membership existed for the resident communities [χ^2 (2, n = 318) = 4.21, p = 0.1218 (Cramer's V = 0.12)].

11.4 Research Methodology and Design

The research methodology and design options for the human component of this study included taking an ethological approach, attempting a more anthropological or sociology-based strategy which targeted structural and system variables, undertaking a quasi-experimental behavioural approach which controlled for and manipulated particular variables of interest, and undertaking a more descriptive and exploratory approach which would allow for the identification, documentation and examination of a spectrum of psychosocial variables of putative relevance to human environmental impact and

environmental management. The decision was made to employ an interview-based community survey approach and to prioritise the more fundamental need to develop a pragmatic process, procedure and instruments for identifying, measuring and exploring these variables and parameters of particular relevance and value to environmental management, monitoring and decision-making as well as to theory development. This methodological decision was made with a clear understanding of the limitations of a non experimental approach (Cook & Campbell, 1979; de vaus, 1985; Kerlinger, 1986; Maxwell & Delaney, 1990; Oskamp, 1984; Sarantakos, 1993). The reality, however, is that "rigorous" experimental approaches in both biology and social sciences have proven to be less than helpful in advancing the cause of either meaningful multidisciplinary research or useful environmental management outcomes and indeed carry their own very problematic assumptions, biases and shortcomings (Peters, 1991; Sagoff, 1985; Shrader-Frechette & McCoy, 1994).

Finally, it is clear that survey-based methodologies will emerge as the only pragmatic, cost- and time-effective approach which has any hope of capturing, measuring, and monitoring these human and community variables of particular concern to environmental management and ultimately environmental conservation. It is also the reality that the vast majority of social science research is essentially survey-based, and sensitive, informed survey research using personal interviews in local communities constitutes a powerful, adaptive, and highly credible methodology which can encompass multiple, multi-level, multidisciplinary research objectives.

Furthermore, in choosing the research design for this study, both strategic and tactical issues were considered (Winkel, 1985). Ten basic questions outlined by Lievesley (1994) provided a general guideline of those traditionally applied to measurement systems and which covered strategic and tactical issues (Table 11.2).

11.4.1 Interview Survey Approach

The research design employed in this study was a community interview survey, a standard research tool used in the social sciences. Interviews were conducted with 320 residents from the three North Queensland communities using a pre-set standardised questionnaire schedule. The standardised interview schedule included a fixed set of questions such that exactly the same words were used with each respondent. A number of these questions nevertheless included an open-ended response format. This technique combined the wish for a narrative response to some questions with the need to minimise interviewer-related variations in presentation context. When implementing this survey,

flexible investigative strategies were employed to meet field demands. First and foremost, the standardised questionnaire was presented to respondents for their own written completion, interviewers acting principally as facilitators. In the few instances where circumstance prevented such an application, interviewers asked the questions according to the standardised format and filled in responses as dictated by respondents.

Table 11.2 Basic research design questions.

1.	Is the information *valid*? Have we asked relevant questions in relevant ways?
2.	Is the information *reliable*? Is it trustworthy, consistent, stable? Would we get the same results if we did the study again?
3.	How *precise* is the information? How much risk due to sampling error is involved in using the information for making decisions?
4.	Does it *generalise*? Which populations and conditions does the information describe?
5.	In what way is the information *biased*? How have human errors been introduced by faulty procedures, by weak questions, and by intervention of interviewers?
6.	How *accurate* is the information? What is the total amount of error due to sampling and due to the biases introduced by interviewers and other human elements in the survey?
7.	Can we *extrapolate* the information? How safe is it to use the information to describe the characteristics of populations or conditions that are different from those we studied?
8.	Do we have sufficient *resources*? Are skilled staff, supplies, and facilities adequate to do a worthwhile survey?
9.	Will we get *clearance* to do the study? Is permission necessary before we can go into the field?
10.	How *useful* will the results be? Who needs the information, and precisely how will they need the results to help them make decisions?

Source: Lievesley, 1994.

Importantly, however, the survey protocol approximated an interview situation in that the researcher was present in a face-to-face situation with the respondent, and the respondents were free to ask questions and/or clarify matters as the questionnaire was filled out. The procedure was designed to maximise the value of the personal interview while retaining the objectivity and standardisation of the survey questionnaire (de Vaus, 1985; Kerlinger, 1986; Neuman, 1997).

11.4.2 Research Sequence

11.4.2.1 Pilot-test of Rural Community

A preliminary investigation of the rural community, Granadilla Valley, was conducted during January and February, 1993. This investigation consisted of both a field survey of the cassowary population (Bentrupperbäumer, 1993) and a structured interview survey of the human population (Bentrupperbäumer, 1994). The aim was to produce a preliminary assessment of the three main interacting components of the environment, humans-landscape-cassowaries, all considered critical to a basic understanding of the nature of reciprocal ecosystem impact between humans and cassowaries. The interview schedule used is presented in Appendix B.1.2.

11.4.2.2 Development of Survey Instrument

The survey instrument was designed to explore respondent's representations and understandings of, and behaviour toward, the natural environment in the context of a North Queensland setting. Within this context, 'social reality', "which has a specific meaning and relevance to the person situated in a sociophysical setting" (Winkel, 1985, p.12), plays an important role. The study attempted to take into account the nature of these "meanings", those that are shared and those that are individually held. The psychological and social constructs selected for investigation were those which social science suggests are most central to understanding human behaviour toward conspecifics and other species, namely general and specific attitudes, understandings, concerns, and motivations, with these constructs encompassing knowledge, values, and beliefs. As well, self-reported behaviour was considered an important albeit indirect measure of actual behaviour. A particular emphasis was placed on the exploration of links between belief/value systems, environmental attitudes, environmental concern, and behaviour. The survey instrument was supplemented by the knowledge gained from long term residence in the region and in two of the target communities, as well as extensive biological research into the endangered species, the cassowary in the same two target communities. In addition, the survey instrument was informed by several previous surveys undertaken for the Wet Tropics Management Authority (e.g., AGB Australia, 1992; AGB NcNair, 1993; Bragg, 1995) and earlier research elsewhere (e.g., Dunlap & Van Liere, 1978, 1984; Kellert, 1980, 1985, 1991, 1993; Reading, 1993; Stern et al., 1993). The survey instrument consisted of many items unique to this study and of relevance to the management of the Wet Tropics World Heritage Area, in particular, the

recovery of an endangered species, the cassowary. It was also intended as a comprehensive survey to establish baseline data for future survey work.

During the construction of the survey instrument, considerable attention was given to design and layout. This included overall presentation of the instrument, the general questionnaire format, ordering of questions, and instructions (Babbie, 1990; de Vaus, 1985; Tanur, 1985). Since two target resident communities had been exposed to local cassowary "politics", there was concern that this might influence participation rates and/or affect answers given to subsequent questions. In acknowledging this as a potential problem, the survey itself was introduced to respondents as a general environmental survey and the layout was such that respondents were first questioned on general socio-political issues, followed by questions on general environmental issues, wildlife issues, specific cassowary issues and finally personal details (Table 11.3 and see Appendix B.1.3).

Considerable attention was also given to the way in which each section was introduced so as to maximise respondents' understanding of what was required, and to maximise and maintain their interest throughout what was a long survey. Finally, the mixed response format employed was interspersed throughout the questionnaire as an additional means of maintaining interest. An evaluation of the final survey instrument was conducted with the assistance of colleagues in an attempt to identify limitations of the instrument (Section 11.6) (Robinson et al., 1991).

Table 11.3 Survey instrument layout.

Section 1a	General cultural and political beliefs, values and ideologies
Section 1b	General environmental beliefs and values
Section 2	Basic attitudes, beliefs, and values toward wildlife in general and cassowaries in particular
Section 3	Level and type of information on the environment, wildlife, conservation issues and cassowaries
Section 4	Perception of cassowaries expressed by beliefs and feelings toward this species
Section 5	Nature and extent of direct experience with cassowaries
Section 6	Sociodemographics

Note: Refer to Appendix A.1.3 for the full survey instrument.

Response Format Both fixed-response and open-ended formats were interspersed throughout. In addition to enhancing respondent interest, this technique provided a means of collecting quantitative and qualitative data. Several established, tested and extensively used scales were included. However, single-item and multi-item composite indices were developed specifically for this research. Details are presented in the following section.

11.4.2.3 Overview of Survey Instrument Layout

Section 1a The **Dominant Social Paradigm Scale**[8] (DSP) was used to measure underlying belief systems in the context of general cultural and political belief/values/ideologies (Dunlap & Van Liere, 1984). The psychometric properties of this scale were checked during its original construction, which confirmed the reliability and dimensionality of the scale's eight hypothesised dimensions (Appendix B.1.4). All 29 items were therefore included in the survey instrument. The only alterations to the original scale was the replacement of the words "American" and "Americans" with the words "Australian" and "Australians" in six items. Responses were presented in a 5-point Likert scaling format from "strongly disagree" to "strongly agree".

Section 1b The **New Environmental Paradigm Scale**[9] (NEP) included twelve items which were designed to measure nontraditional environmental beliefs and values, reflecting a new world view or societal paradigm shift (Dunlap & Van Liere, 1978). Initial testing of the scale indicated that the twelve items were reliable, presenting internal consistency (using Cronbach's alpha), valid (had acceptable levels of predictive validity and construct validity), and were unidimensional (all items loading quite strongly on one factor that explained 65% of the variance). Although further testing of the scale confirmed its reliability and validity, many researchers found evidence of multidimensionality (see for example, Albrect et al., 1982; Arcury, 1990; Geller & Lasley, 1985; Noe & Snow, 1990; Scott & Willits, 1994). The dimensions of this scale are illustrated in Appendix B.1.4. The responses to the twelve items were presented on 5-point Likert scaling format and evaluated according to the extent of the respondents' agreement or disagreement with the statement.

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[8] Details of the construction and application of the Dominant Social Paradigm Scale are presented in Chapter 13. The scale is located on pp. 2-3 of the survey instrument, Appendix B.1.3.

[9] Details of the construction and application of the New Environmental Paradigm Scale are presented in Chapter 13. This scale is presented on p.4, items 1 - 12, of the survey instrument, Appendix B.1.3.

Stern's Belief about Consequences Scale[10] (AC) was a set of three subscales which were developed to assess beliefs about a number of particular consequences that environmental deterioration or protection would have on a set of valued objects - the self, others, and the biosphere (Stern et al., 1993; Stern & Dietz, 1994). These three belief subsets - egoistic, socio-altruistic, biospheric (Appendix B.1.4), were constructed and tested by Stern et al. (1993) in their attempt to develop a socio-psychological model that links these belief measures with three value orientation measures (egoistic, socio-altruistic, biospheric) to behavioural intentions or motivations to act in the following way,

$$M = VegoACego + VsocACsoc + VbioACbio$$

where M is motivation to act (or behavioural intention) and the subscripts ego, soc, and bio refer to the egoistic, socio-altruistic, and biospheric value orientations (V) or the associated beliefs about consequences (AC) (Stern & Dietz, 1994). Although these belief scales have been constructed from a small number of items and hence their reliabilities could be considered to be only moderate, Stern and colleagues (1993, 1994) demonstrated that the scales have considerable predictive power. Responses to the nine items were presented in a 5-point Likert scaling format and evaluated according to the extent of the respondents' agreement or disagreement with the statement.

Section 2 **Kellert's Wildlife Attitude Scale**[11] (Kellert, 1980, 1983) was adapted to include 28 items to measure respondents' attitudes to wildlife in general and cassowaries in particular. The development of a taxonomy of basic attitudes toward animals was first attempted by Kellert in 1974 and subsequently modified and slightly expanded in 1980. This scale has been used extensively in numerous studies on wildlife attitudes throughout the world (e.g., Hill, 1984; Kellert, 1985, 1991, 1992, 1993; Reading, 1993; Reading & Kellert, 1993). In establishing the scale, Kellert conducted five pretests to develop reliable and valid attitude questions. Cluster and other multivariate analyses were employed in the scale construction process (Kellert, 1980). The items of this Section 2 of the survey instrument, though conceptually based on nine Wildlife Attitude Typologies (see Appendix B.1.4), were adapted to the needs of this research. Species of relevance to the Wet Tropics region of North Queensland were selected. Each item was subjected to a 5-point Likert scaling format and evaluated according to the extent of respondents' agreement or disagreement with the statements.

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[10] This scale is presented on pp.4-5, items 13 - 20 + item 2, of the survey instrument Appendix B.1.3.
[11] This scale is located on pp.6-7 of the survey instrument, Appendix B.1.3.

Section 3 The nature and extent of respondents' knowledge level and assessment of the sources of information on environment and wildlife, conservation, and cassowaries available to respondents were measured in this section of the survey instrument. The three scales[12] of this section included,

(a) Perceived Knowledge	respondent's perception of their knowledge level
(b) 'Objective' Knowledge	respondent's level, type, and extent of knowledge
(c) Source of Information	respondent's use and assessment of information sources

The **Perceived Knowledge Index** included three items used to measure three topics which focus on issues relevant to the Wet Tropics region of North Queensland: environment and wildlife, conservation issues, and cassowaries. The response format used included a 5-point scale ranging from 'know very little' to 'know a lot'.

The **'Objective' Knowledge Index** was developed following a review of several general information sources on the issues to be covered (e.g., Breeden & Breeden, 1982; Cogger, 1983; Strahan, 1983), consultation with management agencies (Department of Environment), consultation with colleagues working in biological and ecological research in the region, and own research and experience in the field. This index accommodated four categories of knowledge: *biological knowledge* included simple biological statements; *ecological knowledge* included statements of basic principles or relationships between animals and nature; *issue awareness* included statements about conservation issues and problems; *action strategy awareness* included statements on management principles and practices and individual responsibility. The knowledge questions were designed to include a selection of species of the Wet Tropics region, including cassowaries. In the process of finalising this section of the survey instrument a pretest was conducted (Appendix B.1.5) and administered to thirteen undergraduate and postgraduate biology students, an environmental manager, and a wildlife tour operator. From the results of this pretest a final judgment of the knowledge categories, standard, quality, and overall presentation of the questionnaire was made. Items were modified, deleted or remained unchanged according to these results. The response format used for the items used in this index was true/false/don't know.

The **Information Source Index** was based on that developed by Korsching and Hoban (1990). Three categories of information sources were identified, Government Agencies, Local, and Mass Media. On a 5-point scale ranging from "least" to "most",

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[12] These scales are located on pp. 8 - 12 of the survey instrument, Appendix B.1.3.

respondents were requested to evaluate these information sources according to level of importance, knowledgeability, availability, and local relevance.

Section 4 This section of the survey instrument addressed public perception and behaviour toward a species of specific interest to this research, the cassowary, as well as behavioural intention[13]. The **Public Perception Inventory** was constructed on the basis of the 'factors affecting attitudes toward wildlife' suggested by Kellert (1992). It included two main sections: *perception of individual species* , which addressed topics such as phylogenic relation, morphology, locomotion, aesthetic preferences, presumed intelligence, danger, threat, and ecological significance; and *human/animal relations* , which addressed topics such as threats to survival, conservation status, personal feelings toward the species. The items were informed primarily from personal knowledge and supplemented by items from studies conducted by Kellert (1992) and Reading (1993).

The **Environmental Behaviour Inventory** was designed as a self-report measure of the publics' involvement in activities that might help alleviate environmental threats. The inventory included fixed-response items which specifically identified types of behaviours

in which respondents may have engaged as well as open-ended questions which allowed respondents to describe additional activities. This provided an assessment of the type and level of environmental activity which was divided into three main categories depending on an assessment of the extent of personal effort associated with each activity. This allowed for responses to be weighted according to the activity category. Reasons given for either engaging or not engaging in environmental behaviour were available in open-ended questions.

A **Behavioural Intention Scale** was included in this section of the survey instrument. This scale was constructed by Stern and Dietz (1994). A total of 30 items made up this section of the survey instrument. The response format throughout this section was mixed and for the first time open-ended questions were introduced. For the closed questions, both the 5-point Likert scale and choosing-the-option formats were used. For comparisons between species, the same species were used throughout the survey.

Section 5[14] This section of the survey instrument addressed issues of relevance to direct experience with cassowaries. Questions within this section were mixed in response format and issues addressed. The resultant information provided for two sets of

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[13] These scales are located on pp. 13 - 20 of the survey instrument, Appendix B.1.3.
[14] This section of the survey instrument is located in Appendix B.1.3, pp.21-23.

data. One provided general and varied information about respondents' direct experience with cassowaries. Direct experience with the target of inquiry is considered to play an important role in people's understandings and reactions toward the target (Eagly & Chaiken, 1993; Newhouse, 1990; Olson & Zanna, 1993; Zimbardo & Leippe, 1991). The other provided valuable biological information of where, when, how often and the age category of cassowaries sighted. This is one way of achieving fairly basic information required for monitoring the status of the cassowary population.

Section 6[15] Various social and environmental-contextual characteristics associated with the respondents were measured in this section of the survey instrument. As noted in the first chapter, both social-situational and environmental-contextual dimensions of the human system provide for a more holistic understanding of the human component of the ecosystem. This section included the conventional demographic variables such as gender, age, education, occupation, income, dependent family members, in addition to social constructs such as group membership, and information about residency and land use activity.

11.4.2.4 Pilot-testing Survey Instrument

The survey instrument was pilot-tested on a small but representative sample of the target communities. This included one person from each resident group and two additional persons outside these communities. The instrument was modified according to the results of these tests.

11.4.2.5 Survey Administration

Once the community sample for each of the survey areas had been chosen, strategies were then developed for the administration of the survey. A summary of these strategies is outlined[16].

Selection and Instruction of Survey Administrators Third and fourth year psychology students and two psychology staff members from the Department of Psychology and Sociology at James Cook University assisted in this phase of the research. The survey administrators were given very detailed instructions during three

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[15] This section of the survey instrument is located in Appendix B.1.3, pp.23-24.
[16] For further details refer to Bentrupperbäumer (1994).

sessions as to the administration of the survey and their own personal appearance and conduct. Each survey administrator was provided with his or her own package of questionnaires, and survey response and survey interview note formats which they were required to fill in at the conclusion of each interview. This provided details of response/nonresponse rate and reason, and any additional information each of the respondents wished to provide.

Notification of Residents One week prior to the administration of the survey, a letter was hand delivered to each of the participant households in the rural and semiurban communities notifying them of the research project and the survey (see Bentrupperbäumer, 1994). Due to the nature of the urban sampling no prior notification was provided to Townsville residents.

Administration of Survey In the rural and semiurban communities the survey was conducted over two consecutive weekends (16-17 & 24-25 April 1994) and in the urban community over one weekend (24-25 May 1994). Sixteen survey team members were available each weekend, 12 were survey administrators (students), four were coordinators (Professionals + myself). The team was divided into four groups, each being strictly supervised by the coordinators. After each interview the survey administrators returned the questionnaires to the coordinator whose role was to sort and check them, give directions as to the location of the next sample household, immediately sort out any problems and generally act as a support base to the survey administrators. This system ensured that the survey was administered as effectively and efficiently as possible.

Because of the structured nature of the survey instrument, survey administrators acted primarily as facilitators rather than interviewers. Their role was to carefully assess the situation and when possible have respondents complete the questionnaire themselves with the administrators helping them through the process when needed. When this was not possible, in the case of the elderly and those with language difficulties, administrators were required to act as interviewers. In order to ensure that as even a gender sample as possible was obtained and to avoid interference from other household members, both male and female members were encouraged to participate, completing their own questionnaire independently under the supervision of the administrator.

The survey team was very impressed with the willingness and sincerity of the respondents in completing the questionnaire. The careful consideration given by the majority to each of the questions meant the actual time taken to complete the survey averaged out at approximately one and one half hours.

Survey Follow-Up A notice of appreciation to the residents of the rural and semiurban communities was placed in a local newspaper, the Cairns Post, on 28th May 1994. Due to the considerable number of respondents who expressed interest in the research and results of this survey, records were kept of their addresses (with their permission) so that they could be kept informed. An initial letter was posted to them on the 30th May 1994. A letter of appreciation with respect to the professionalism of the student assistants was also presented to Professor Innes, Head of Department of Psychology and Sociology, James Cook University (see Bentrupperbäumer, 1994).

11.5 Analyses

With the focus being on multiple levels of analysis of the human component of the ecosystem, the analyses include summary and descriptive statistics of general and specific attitudes, concerns, and behaviours, with these constructs encompassing knowledge, values, and beliefs expressed as both individual and shared understandings. This descriptive and comparative presentation and analysis allows for a broad and general understanding of respondents' environmental values and perceptions, and how their own behaviour does or does not reflect their attitudes, values, concerns and understandings relating to a spectrum of environmental matters and issues. Also included are bivariate and multivariate analyses of the relationships between selected constructs/variables. The following outline provides a general overview of the analyses conducted in this study, including rationale and type.

11.5.1 Population and Social Characteristics of Respondents

The population and social characteristics reflect areas of respondent groupings comprising individuals with a similar demographic and social profile. The chi-square analysis was used to determine the relative likelihood of a statistically significant link or difference between two sample distributions. The chi-square test statistic ($\chi 2$) and probability level were computed together with Cramer's V which gave an indication of the strength of the relationship between categories (Diekhoff, 1992; Howell, 1989; Pagano, 1994). Post hoc cell contributions identified variables responsible for significant differences between categories at or above 95% level of significance (Abacus Concepts, 1987).

11.5.2 Psychometric Evaluation of Measurement Instruments

A psychometric evaluation of the measurement instruments was undertaken in order to confirm empirically the reasonableness of treating the items as a single scale, and to consider issues of dimensionality, internal consistency, and construct validity. Although for many of the general social and environmental instruments used in this study such tests were completed during the construction of the initial scales (see for example, Dunlap & Van Liere, 1978, 1984; Stern et al., 1993; Kellert, 1980), one of the questions of interest to this research was the appropriateness and utility of these scales in the context of North Queensland and in the pragmatic context of environmental management needs. Such an evaluation ensures the scales are reasonably and reliably measuring what they are supposed to measure. This in turn allows for useful comparisons across studies, replication of findings, and communication between researchers, policy makers and managers. It also allows for the examination of links between variables and how a number of variables, in concert, impact on behaviour. Valid and reliable measures are also a requirement for adequate assessment and monitoring in the context of social impact assessment and ongoing environmental management. The item analysis approach focused on item-item and item-total score intercorrelations for internal consistency, which was confirmed by an additional measure, Kaiser's measure of variable sampling adequacy. For the complete item analysis, the operating characteristic of each item was also examined. The frequency of responses to the various agreement alternatives were combined to determine the proportion of respondents who agree with an item. Factor analysis was performed to examine scale dimensionality and the relative importance of dimensions using principal component and varimax transformations (Kim & Mueller, 1978; Tabachnick & Fidell, 1989).

11.5.3 Respondents' Pyschosocial Profile

There were practical and theoretical reasons for developing a general profile of respondents with respect to the psychosocial variables under investigation. Primarily, the profile was needed to adequately describe and characterise the target communities, to examine their representativeness vis a vis regional population statistics, and to establish a specifiable baseline. In addition, such an analysis situates the study communities temporally and spatially - an underlying rationale for monitoring, evaluation and assessment programs. Changes in the community profiles across time and space can be monitored, providing an important contribution to evaluation processes and impact assessment.

Two main objectives have determined how the questions posed in each of the results sections of the following chapters were framed and answered in the data analysis: (1) to assess an individuals' representation and understanding of the natural environment using the psychosocial variables under investigation; and (2) to examine the situational properties of these responses. The analysis therefore proceeds in the following way. For each psychosocial variable a general outline of individual responses and scores taking into account the total respondent sample is presented. This provides a basic assessment of the individual's relationship to the natural environment according to these psychosocial variable, while excluding reference to the circumstances or situations in which this relationship occurs. An analysis of the situational properties of the relationship begins with the environmental dimension of individual responses, including those aspects of respondents' physical landscape that are characteristic of the resident groups. Factors that are particularly relevant to the social-situational dimension of individual responses include population characteristics such as: (1) the demographic variables - gender and age; (2) the social characteristics - education, income, residency details; and (3) the group membership characteristics. There is an overlap in the use of resident communities as an environmental-contextual and social-situational dimension. It is analysed in the environmental-contextual section but its social dimension is considered in interpretation of results. The rationale for these analyses is to provide a general profile of these psychological attributes and to deal with measures of variability in the attributes in the context of both a physical and social setting, highlighting the potential for an interaction effect between these settings.

General Profile of Psychosocial Constructs The general descriptive statistic used included mean and standard deviation (SD) which was reported as mean ± SD (Diekhoff, 1992; Pagano, 1994). Frequency distributions presented the frequency of occurrence of score values.

Resident Community Profile and Comparisons The general descriptive statistic, mean and standard deviation (SD) reported as mean ± SD (Diekhoff, 1992; Pagano, 1994) was used to document resident community profile. One-way analyses of variance were undertaken for the three resident groups to reveal the presence of significant differences between groups (Diekhoff, 1992; Pagano, 1994; Tabachnick & Fidell, 1989). Fisher's multiple-comparison procedure (the F test or F statistic) for the one-way analysis of variance context when the number of groups is equal to three has several desirable properties including greater statistical power, Type 1 error control, consonance and flexibility (Davis & Gaito, 1984; Levin et al., 1994). Post hoc comparison, Fisher PLSD, was used to identify which resident group means were significantly different at or above a 95% level of significance (Abacus Concepts, 1987).

All comparisons between rural, semiurban and urban communities refer to the actual communities involved in this research, Granadilla, Mission Beach and Townsville, and no extrapolation to 'community type' is intended.

Social-Situational Profile of Individual Responses The general descriptive statistic, mean and standard deviation (SD) was used to document the social-situational profile of individual responses. Unpaired-t tests were used to compare the means of two samples when the dependent variable was interval or ratio (Diekhoff, 1992). The one-way analyses of variance and associated post hoc comparisons, as well as bivariate correlation procedures, were undertaken for all multiple group comparisons.

Reporting the Statistics The general format used throughout this study for reporting statistics is as follows: [name of statistic (degrees of freedom, number of cases) = the value of the statistic, the probability of this statistic occurring by chance (secondary statistic if appropriate) (APA Manual, 1994; Bragg, 1995), for example:

1. Chi-square test statistic	[χ^2 (10, n = 292) = 31.96, p = 0.0004 (Cramer's V = 0.23)].
2. Pearson product-moment correlation	[r (319, n = 320) = 0.54, p < 0.001]
3. t-test	[t (315, n = 317) = 3.45, p = 0.0006]
4. One-way ANOVA	[F (2, 314; n = 316) = 148, p = 0.0001; Fisher's PLSD; *F*max = 1.23].

Additional Notes on Statistics Standard deviations are reported in this study rather than variance or standard error as the data analysis has principally involved descriptive rather than inferential statistics, and figures typically reflect actual measures of variability with respect to psychometric scales rather than estimates of population variance (Diekhoff, 1992; Ferguson & Takane, 1989; Zar, 1984). This accords with American Psychological Association convention (APA Manual, 1994) and standard statistical practice in the social sciences (Cone & Foster, 1993; Diekhoff, 1992; Ferguson & Takane, 1989), particularly in the context of nonexperimental group comparisons. When the intention was to present the relative endorsement levels of subscales of a composite score so that comparisons could be made between the scores, the subscale means were "standardised" or "normalised" (Neuman, 1994) to a 5-point scale. In these instances "standardised" means and standard deviations were reported and graphed.

All statistical analyses in this study address the parametric assumptions required for one-way analyses of variance and/or the correlational analyses undertaken. The assumptions for one-way ANOVA essentially relate to normality, homogeneity of variance and interval level measurement (Coakes & Steed, 1997; Cone & Foster, 1993; Lindman, 1992; Tabachnick & Fidell, 1989). An initial examination of all item and composite index responses was made with respect to distribution and normality. The only data set which exhibited substantial departures from normality was the NEP scale (Section 13.4.2, Chapter 13). The group comparisons relating to community of residence and education in particular, had to contend with unequal sample sizes. The residence community samples, for example, were rural = 35, semiurban = 143, and urban = 143, and the education level samples were primary = 28, secondary = 129, TAFE = 62, and university = 98. While the one-way ANOVAs employed to examine group differences are surprisingly robust to moderate violations of parametric assumptions (Cone & Foster, 1993; Ferguson & Takane, 1989; Lindman, 1992; Tabachnick & Fidell, 1989; Zar, 1984) all comparisons involving unequal sample sizes report a conventional homogeneity of variance test (Fmax; Ferguson & Takane, 1989; Keppel, 1991). When the assumption of homogeneity of variance was not possible, i.e., when Fmax exceed 3, the next most conservative significant level was employed following Keppel (1991), and results are suitably qualified.

11.5.4 Variable Interrelationships

Bivariate and multiple statistics were used to describe the associations among the variables/constructs under consideration. These quantitative research tools add considerably to the understanding of the functional relationships between variables (Diekhoff, 1992; Lewis-Beck, 1980; Schroeder et al., 1986; Tabachnick & Fidell, 1989).

11.6 Methodological Issues

The survey methodology and measures employed raise a number of issues in the context of the present research, all of which relate to the reliability and validity of the measures. The first three issues to be outlined are concerned with potential response distortions which can produce systematic errors in measurement. The main sources of this type of contamination are reactive responding, socially desirable responding, and self-report (Himmelfarb, 1993; Lincoln & Guba, 1985; Paulhus, 1991). In all of these there is the tendency on the part of individuals to respond to statements for reasons other than the content of the statements. However, strategies do exist and have been employed in this research for minimising and/or measuring such effects. The second main methodological issue is related to the measures used and addresses the assessment of construct reliability and validity.

11.6.1 Potential Response Distortion

11.6.1.2 Reactive Responding

A very salient consideration in this research was the fact that two communities involved in the survey, the rural and semiurban, could be characterised as polarised and divided communities with respect to development and conservation issues generally, and cassowary conservation and environmental management in particular. A questionnaire conveying "environmental" and "conservation" topics could provoke responses which were, in part, a reaction to the perceived motivations and attributions of those conducting the survey. This situation meant that suspicion and reactivity could potentially distort responses. A strategy employed to counter this problem was for interviewers and the research itself to be introduced as hopefully neutral University students conducting an independent University research project. The assessment made following the survey was that the interviews were "reactive" in that they in effect invited respondents to express their personal views on a number of controversial issues, but that, overall, responses were surprisingly frank, honest, and genuine. In this case this polarisation reactivity did not adversely influence responses and was, in fact, part of what was being measured. It is also possible that the survey interview was reactive in a more conventional sense in that it changed respondents attitudes and knowledge levels. This constitutes a useful and desirable by product of such "environmental" surveys and would not have unduly influenced present results. It would, of course, have to be factored in to any subsequent longitudinal research.

11.6.1.2 Socially Desirable Responding

The second methodological issue concerns social desirability. Socially desirable responding is the systematic tendency to give answers that make the respondent look good in order to obtain social approval and avoid social disapproval (Himmelfarb, 1993; Paulhus, 1991). It was the case that many of the items in the survey instrument could be seen to encourage a socially desirable response. While this was perhaps inevitable with respect to environmental concern measures, it must be remembered that the divergence of views in the communities surveyed was such that very different responses to particular items may have been deemed socially desirable.

In this research a number of technical strategies were applied for controlling the influence of socially desirable responding. The first was to employ research assistants as the facilitators/interviewers who were unknown to the majority of respondents. This was to avoid direct contact with the researcher, who was known by many residents in two of the target communities. In addition, unless directly asked, the name of the researcher remained anonymous and the research was presented as one of a number of studies conducted at the James Cook University which was exploring people's responses to the north Australian environment. The second strategy was to enlist respondents' cooperation by assuring them of the acceptability of all responses. They were told throughout the survey that, "There are no right or wrong answers, and please do not think that your views will be negatively or positively judged in any way", and, " Do not be concerned if you do not know the answers to some of these questions". Thirdly, respondents were assured of anonymity and confidentiality.

Finally, strategies were applied which were considered to reduce the stress factors, speed, emotional arousal and distractions which are known to increase desirable responding (Paulhus, 1991). Potential stress due to respondents' language, reading or writing abilities was overcome by facilitators switching their role to interviewer, asking the survey questions, and completing the questionnaire according to respondents' answers or instructions. Distractions due to interference by other household members was avoided by requesting all present to each complete a questionnaire independently of each other. All of these strategies were considered to reduce the situational pressure for desirable responding. Overall it was thought that social desirability was not prejudicing responses and did not influence group comparisons.

11.6.1.3 Self-Report

The third methodological issue relates to another potential source of response distortion which can produce systematic errors in construct measurement and interrelationships, *self-report.* Were respondents able to tell us what factors influenced their behaviour, why and how? Are self-reports accurate or equivalent indicators of beliefs, attitudes, concerns, actual behaviour, etc.? Using self-reports as indicators of these variables is a recurring problem in the study of relationships between the variables and the measurement of the variable (Himmelfarb, 1993; Manfredo & Shelby, 1987; Nisbett & Wilson, 1977; Schuman & Johnson, 1976). Some reasons given for the potentially problematic nature of self-reports are, "people may evade answering or distort their reports to protect their privacy, to avoid legal prosecution, to gain economic advantage, ... or to protect particular identities." (Himmelfarb, 1993, p.72). Past studies have shown a broad range of findings regarding the accuracy of self-reports. Manfredo and Shelby (1987) found when attempting to explain the relationship between the variables, actual past behaviour, attitudes and future behaviour, self-report appeared to be an important mediating variable.

There are several ways to deal with this issue. Firstly, it is important to be aware that self-report can be wrong, self-serving and distorting, and to acknowledge that many causal mediating factors impacting on environmental concern and environmental behaviours are undoubtedly out of awareness. While such self-report does not necessarily correspond with actual behaviours, it is very indicative of how individuals view their own motivation and behaviour (Schaffer, 1978). Notwithstanding these caveats, respondents appeared to be well able to consider and answer most interview questions without difficulty and to have reasonable insight on matters relating to why or why not they held a position and were or were not engaging in a particular behaviour. Secondly, the same technical strategies which were employed to reduce response distortions that potentially could occur due to social desirability, were believed to have been applicable to those due to self-report.

11.6.2 Construct Operationalisation

A recurrent issue throughout this study has to do with the nature and validity of the constructs being used[17]. The problematic character of a number of conventional measures which were selected for use in this study is again emphasised. The measures of social,

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[17] Refer to previous discussion, Chapter 10, Section 10.4.5.

political and environmental beliefs and ideologies employed, the DSP and NEP for example, can be viewed as measures of multiple domains. Researchers such as Albrecht et al. (1982), Dunlap and Van Liere (1978,1984), Noe and Snow (1990), Noe and Hammitt (1992), and Scott and Willits, (1994), used these scales to measure environmental attitudes; others have used these same scales to measure fundamental belief/value systems (Edgell & Nowell, 1989; Steel et al., 1990), and still others considered them to be measures of environmental concern (Scott & Willits, 1994; Stern et al., 1993). Research findings with respect to reliability, factor loadings and construct validity have also been mixed. However, a recent review of these scales has confirmed their multidimensionality with respect to all of the above constructs. The decision was made nonetheless to employ some conventional and frequently used measures for the purpose of comparison with published results and to allow for the broad characterisation of different respondent groups with respect to value endorsement and ideological orientation.

Chapter 12

A Focus on Attitudes: *Individual* Representations and Understandings of the Natural Environment

12.1 Introduction

In the first chapter of this study it was noted that a general consideration deriving from the need to address the environmental crisis concerns the questions to be answered by psychological research on environmental issues, particularly those that are relevant to environmental management and endangered species recovery. The principal task identified was to determine the most useful way of framing the human component of the ecosystem. Appropriately conceptualising and adequately measuring individual and community representations and understandings of the natural environment was considered central to this process. In addition, the concepts and measurements would have to be incorporated into psychological theory which would serve to frame and focus this inquiry. This theoretical framework would allow for salient features of observations to be recognised and empirical questions asked.

While there exists a diverse array of theoretical constructs for framing the human component of the ecosystem, examining one way in which individuals represent and understand the natural environment, discovering what they think and do about it, framing this in psychological theory, and applying this information to the pragmatic needs of environmental management is the focus of this chapter. This specific insight is gained primarily by way of one of 'the most distinctive and indispensable concepts' in social psychology (Allport, 1968), the attitude concept. Traditionally considered as an *individual* psychological tendency toward a particular entity in the outside world, attitude is one concept used by social psychologists to measure *individual* representations and understandings of this outside world. It is also used to account for variations in *individual* behaviour and to measure change. Nevertheless, this focus on attitudes and the implied *individual* level of analysis does not deny the existence of other equally suitable ways of framing individual and community representations and understandings of the natural environment, nor does it dispute the social nature of attitudes. Rather, the objective was to assess the theoretical and pragmatic utility of this particular individual level approach, and to differentiate between that which is an *individual* phenomenon and that which is *shared*, a topic addressed in the following chapters.

12.1.1 Chapter Outline

The attitude concept is introduced by first asking why are attitudes important? A general overview of key aspects of the attitude concept, first as a theoretical construct and then in its role in environmental conservation and management, is initially presented.

The second section of this chapter outlines the theoretical concepts, models, and previous scales used to frame *attitudes toward environmental targets*. It is recognised that even as an individual phenomenon attitudes can be analysed on a number of levels, each providing a different psychological perspective of the concept. In addition, this research concedes that the term attitude is widely used by psychologists and the public alike, often interchangeably with terms such as beliefs, opinions, values, concern, etc. The scientific and everyday uses can be difficult to disentangle. The challenge for this research has been to clarify at what level attitude has been analysed and for what reason, and to deconstruct the concept and reassemble it in a way that places it within a credible theoretical and scientific framework. At the same time, it has been necessary to provide for the pragmatic needs of environmental managers who have to deal with the realities of endangered species recovery. The third and fourth section of this chapter present and discuss results of analyses of *attitude toward environmental targets*.

12.2 Why are Attitudes Important?

Many social psychologists view attitudes as a key concept in the theoretical development of their science (e.g., Pratkanis et al., 1989). Many environmental psychologists have used this construct and applied it extensively to studies on the environmental crisis (for reviews see for example, Bell et al., 1996; Bonnes & Secchiaroli, 1995; Stern & Oskamp, 1987). Environmental managers can benefit from this substantial theoretical and empirical research by adapting the 'attitude' construct to the needs of conservation and management of the natural environment, wildlife and endangered species, and in particular by utilising the resultant increased knowledge base to inform better decision and policy making.

12.2.1 Importance of Attitude as a Theoretical Construct

Within the domain of social psychology the attitude construct has received considerable attention at both a theoretical and empirical level. The centrality and importance of this construct is reflected in the development of many and diverse theories of attitude-behaviour relations, attitude function, formation and change, and in the pragmatic application of attitude assessment and change to the needs of society. The multifaceted nature of attitude identifies many variables as attitudinal, and the conceptual tolerance represented by this breadth has been seen to be beneficial in its early theoretical

development (Greenwald, 1989a). This has enhanced its popularity and ensured its wide acceptance in social psychology and across the social sciences.

12.2.1.1 Attitudes and Behaviour are Linked

An important reason for this focus on attitudes is the knowledge that attitudes and behaviours are linked. In an attempt to understand why people behave the way they do, emphasis in psychology has been placed on the assessment of internal processes such as attitudes, beliefs, values, motivations, concern and knowledge, their interrelationships, and their relation to environmentally responsible behaviour. The more general issue of the nature of links between attitudes and behaviour is a classic issue and challenge within the social sciences. This is also a very pragmatic concern for environmental managers. How do attitudes and understandings influence the behaviours impacting on ecosystem functioning, and how can one effectively intervene in this psychological and social domain to effect positive behaviour change? The pragmatic need, here, requires a more disciplinary-specific and theoretical consideration of the social psychology of attitudes, attitude function and attitude formation and change.

There are a number of aspects of potentially destructive human behaviour which psychology has researched extensively. One of the most significant of these for the environment are attitude-behaviour relations, an area central to the development of behaviour change strategies. The attitude-behaviour literature offers considerable insight into the nature of the relationship and in particular the problems of consistency between these two constructs (see for example, Ajzen & Fishbein, 1977; 1980; Bagozzi, 1992; Eagly & Chaiken, 1993; McGuire, 1989; Schuman & Johnson, 1976). It is an area of research initiated by the classic 1934 La Piere investigation and revitalised by the comprehensive review of the attitude-behaviour research produced by Allan Wicker in 1969. A consequence of the La Piere legacy has been the development of a number of theoretical models in the attempt by social psychologists to explain the nature of the attitude-behaviour relationship and the problems of consistency.

Despite the pessimistic conclusions of early research (e.g., Wicker, 1969), progress in the field of attitude-behaviour relations has resulted in the general acceptance that these are highly complex relations and yet "attitudes and actions do covary *under certain conditions*" (Breckler & Wiggins, 1989, p.419). The way in which this progress has been achieved was to reconsider methodological issues such as: compatibility - general versus specific measurements; matching measures of attitude and behaviour with respect to target, action, context, and time (Ajzen & Fishbein, 1977; Eagly & Chaiken, 1993);

developing formal models that explain the underlying processes by which attitudes serve as causes of behaviour (Ajzen & Fishbein, 1977; Ajzen, 1989; Eagly & Chaiken, 1993); and identifying variables found to moderate, that is strengthen or weaken, the attitude-behaviour relation (Davidson & Jaccard, 1979; Eagly & Chaiken, 1993; Zanna et al., 1980).

Although a substantial emphasis has been placed on the linear causal direction of attitude to action, equally important has been the feedback process, that is, action can in turn cause attitudes should those attitudes be inconsistent with the action. A number of theories have been developed in social psychology to explain this action-attitude link, for example, Festinger's cognitive dissonance theory, Bem's self-perception theories, and the attribution theories of Jones and Davis (Deaux & Wrightsman, 1988; Howitt et al., 1989; Nemeth, 1974; Tedeschi et al., 1985). For example, cognitive dissonance theory explains how people change their attitudes in accordance with overt behaviour. According to this approach, if people behave in a way that is inconsistent with their attitudes, the resulting dissonance is alleviated by changing attitudes so they correspond with the committed action.

On the other hand there is the problem of the consequences of behaviour not being fully realised prior to the impact of that behaviour on what people value. This is a particularly important issue in environmental research. Stern and colleagues (1987, 1992a, 1992b) have addressed this issue of feedback from action to attitude in their model of interactions between humans and environmental systems, which has been discussed in detail in chapter three. This feedback loop is seen to be particularly important, as the consequences of action itself on what people value are what motivates a change in attitude and future behaviour. This can be explained by the "new look dissonance theory" proposed by Cooper and Fazio (Brehm & Kassin, 1990). According to their proposal there must be antecedent conditions such as unwanted *negative consequences* and feelings of *personal responsibility* that produce a feeling of discomfort for the person to want to change their attitude. In addition, this person must feel generally *aroused* and that arousal must be *attributed* to his/her behaviour. Under these circumstances, if the person has the need to reduce dissonance, attitude change is more likely to occur as a consequence of behaviour. Overall however, the relationship between behaviour and attitude is viewed as being reciprocal (Schuman & Johnson, 1976).

12.2.1.2 Attitudes Serve Various Functions for the Individual

Why do people hold the attitudes they do? This functional perspective on attitude formation and change argues that attitudes are useful to people in some way, people

maintain their attitudes for specific reasons, attitudes serve a function (Augoustinos & Walker, 1994). Primarily attitudes are believed to fulfil psychological needs for the individual (Eagly & Chaiken, 1993; Herek, 1986; Olson & Zanna, 1993; Snyder & Debono, 1989). Knowledge of this motivational basis for attitudes is considered to be a key to understanding how attitudes can be changed (Eagly & Chaiken, 1993). Herek (1986) and Shavitt (1989) demonstrated through their research that the success of attempts to change an attitude depends on the function that attitude serves for its owner. This highlights the importance of links between attitude function, attitude change and ultimately behaviour change, links important in environmental research.

Augoustinos and Walker (1994) note that the functions of attitudes proposed by the above researchers have been theorised on an individual level as opposed to a societal or community level. As a consequence, they propose that attitudes serve social as well as individual functions and go on to suggest three such functions: the first of which is to "locate an individual within a social matrix", the second is that "they are a mechanism for the transmission of social beliefs and attitudes, social representations and ideologies, to the individual", and the third is that "they play an explanatory, and hence justificatory, role in orienting the individual to the social world" (p.18).

Attitudes do help people make sense of things and order their worlds. While beliefs and values are usually used in this context, attitudes help people make sense out of and 'take a stance' towards issues and events. With respect to World Heritage listing, for example, attitudes helped people to position themselves in what was a very heated public debate. In taking a position they not only defined who they were and where they stood but they also imposed meaning and order and thought on the issue.

12.2.1.3 Attitudes do Change

Psychologists devote a considerable amount of attention to theoretical and empirical research on attitude change[1], a term used so broadly as to incorporate the phenomenon of attitude formation as well (Chaiken & Stangor, 1987; Eagly & Chaiken, 1993). Rather than accepting attitudes as static structures, attitude formation and change theories promote the notion of a dynamic system where attitudes are formed and modified continuously. One important reason often cited for this focus by social scientists on the formation and changing of attitudes is that "people's attitudes often seem to be

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[1] For a selection of reviews see Chaiken & Stangor, 1987; Cialdini et al., 1981; Eagly & Chaiken, 1993; McGuire, 1985; Olson & Zanna, 1993; Zimbardo & Leippe, 1991.

problematic".... so .... "if people's attitudes could be changed, the reasoning goes, we would have a better world - one in which prejudices are lessened, social conflict is reduced, and life-styles are more healthful" (Eagly & Chaiken, 1993, p.220).

This reasoning fits well with the current environmental crisis since attitudes are considered to be a critical factor in determining how people behave toward the environment (Bell et al., 1996). Changing attitudes is therefore seen as a necessary precursor to changing behaviour. Understanding the psychological processes underlying attitude formation and change enables researchers to predict the extent to which attitudes will change (Eagly & Chaiken, 1993) and the strategies that can be used to promote that change (Edwards, 1990). Edwards found that the conditions under which an attitude is formed influenced the ability of that attitude to withstand change via strategies such as persuasion.

The process theories of attitude formation and change propose that attitudes are formed and modified as people gain information about the attitude objects, a cognitive perspective (Chaiken & Stangor, 1987; Eagly & Chaiken, 1993; Edwards, 1990). On the other hand, there are a set of theories which emphasise the role of affective and motivational processes in the formation and change of attitudes (Eagly & Chaiken, 1993; Edwards, 1990). In contrast to cognitive processes, these theories refer to a variety of emotional and motivational mechanisms such as conditioning, mere exposure, reinforcement, consistency, and function, and include constructs such as emotion, mood, affect, arousal, incentives, needs, motives, etc. Despite these two sets of theories of attitude formation and change, the distinction between the two processes, that is, cognitive-based and affective/motivational-based, is not dichotomous (Edwards, 1990). Rather, cognition, affect and motivation are considered to jointly determine attitude formation and change.

12.2.2 Specific Contributions of Attitudes to Conservation and Management

From a theoretical perspective it is clear that the study of attitudes has profound implications for environmental conservation and management. Human action plays a significant role in determining the success or failure of sustained diversity of life on this planet. In turn, attitudes are viewed as a critical antecedent to these individual and community actions toward the natural environmental (Kaiser et al., 1996; Newhouse, 1990). The study of attitudes can therefore make several specific contributions to the conservation and management of the natural environment. Stern and Oskamp (1987) identify three specific contributions:

> Firstly, it is useful to know whether there are broad, general orientations that link together attitudes on various environmental resource problems. Second, attitudes may be related to people's environmentally relevant actions. Third, regardless of their relation to behaviour, people's attitudes about specific environmental issues are of interest in their own right and are often cited in public-policy debate. (p.1051)

These contributions provide those who must make decisions about the environment with a more complete information base on which such decisions can be formulated (Heberlein, 1989). There is no substitute for good data in terms of quality and diversity. However, a cautionary note on the contribution of attitudinal data to environmental management is warranted. The findings indicate that there are obstacles to the utilisation of social science research in general (Oskamp, 1984). For example, the contribution of attitudinal data will partly depend on the willingness of managers to accept this information base. Often managers regard such information as nonconsequential. It will also depend on the ability of this social psychological construct to deliver the type of information required to assist managers in problem formulation and development and implementation of practical conservation and management strategies.

12.2.2.1 Attitudes toward the Natural Environment

When limiting the view of attitudes toward the natural environment, it becomes apparent that during the past 25 years there has been an increased interest among psychologists and sociologists in identifying constructs that measure the interrelationship between people and the natural environment in an appropriate and meaningful way. This interest arose out of the need for these disciplines to respond effectively to the very real issue of the environmental crisis. Initially, criticism was directed toward psychology in particular for its failure to recognise the scope of its responsibility in this issue (see for example, Maloney & Ward, 1973; Wohlwill, 1970). These authors claimed that in light of the urgency and magnitude of this problem, psychology's response could be characterized as "traditional" and "meagre" (Maloney & Ward, 1973). Psychology has advanced significantly since then, particularly in the field of social and environmental psychology. As a consequence constructs such as attitudes have been used in numerous studies on environmental issues with varying degrees of success.

An overall assessment of the literature would lead one to conclude that attitude is an important construct for understanding the interrelationship between people and the natural

environment simply from the sheer volume of use[2]. Many consider that attitudes play a key role in understanding, predicting, and modifying behaviour toward the natural environmental (e.g., Cook & Berrenberg, 1981; Grob, 1995; Hines et al., 1987; McGuinness et al., 1977; Scott & Willits, 1994; Stern, 1992a). Zimbardo and Leippe (1991) argue that "the solution to what many believe is a global crisis rests in passionately nurturing pro-environmental attitudes and beliefs throughout the culture" (p.339). However, a problem with previous environmental research which has used the attitude construct has been the lack of a clear, concise theoretical and conceptual framework. As Stern et al. (1995) point out, "this literature has been criticized as atheoretical because it does not incorporate work on the social psychology of attitude formation and attitude-behaviour relations" (p.724). In addition, the use of "attitude" is loose, vague, and inconsistent.

12.2.2.2 Attitudes toward Wildlife/Endangered Species

A specific component of the natural environment that has been of concern to environmental managers is wildlife, in particular endangered species. It is now acknowledged that the successful conservation of endangered species requires an understanding of the human-species interface and the sensitive reconciliation of human and nonhuman needs (Maguire & Servhenn, 1992). Human-animal relations and animal welfare in general have been extensively written about in the last twenty years (see for example, Kellert, 1996; Plous, 1993; Shepard, 1996). Of these writings the most comprehensive studies on human-animal relations which focused on wildlife in general and endangered species in particular were those conducted by Stephen Kellert and colleagues (see for example, Kellert, 1980, 1983, 1985, 1991, 1992, 1993, 1996; Reading & Kellert, 1993).

Most of Kellert's studies were conducted for the U.S. Fish and Wildlife Service, a governmental management agency which had become increasingly interested in the relationship between attitudes, including values and perceptions of wildlife, and the conservation of species (Kellert, 1996). This agency was motivated by the many management challenges it faced at the time including public "attitudes" which questioned the traditional approach to managing wildlife uses. From these broad public attitude studies, Kellert generated a typology of attitudes toward animals. This typology provided an assessment of people's representation and understanding of wildlife which the U.S.

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[2] In a review of the literature between 1967 and 1995, Kaiser, Wölfing & Fuhrer (1996) found 847 publications dealing with environmental attitudes.

Fish and Wildlife Service believed would better equip it for dealing with the management issues of the day. The outcome was "to manage wildlife in a more socially acceptable manner" (Kellert 1996, p.5). The management implications of attitudinal data in endangered species recovery have been a key aspect of Kellert's work.

12.2.2.3 Attitudes and Environmental Decision and Policy Making

Translating psychological research into policy decision making using constructs such as attitudes has been the challenge for a number of environmental researchers. One promise of the assessment of individual and community attitudes is that it can provide a better information base for decision and policy formulation. The development, implementation, and evaluation of sound environmental policies depend on this. Heberlein (1989) identifies three types of information most salient to environmental decisions which is provided by attitudinal data: goal or objective setting information about a particular program - how much is enough; evaluative information about the level of public support and knowledge relevant to a program - what people like and know; and behavioural information about what people might do.

Goal-related Information In the development of environmental policy environmental managers are concerned with people's perception of environmental functioning and well being, and with what they believe should be done. This helps environmental managers establish goals for particular programs.

Evaluative Information A core concern of environmental managers is whether the public supports or opposes some aspect of a program or project, or the entire program/project itself, and where the public stands on a particular environmental problem such as a endangered species. Attitudinal data provide useful information about what the public believes about a particular environmental problem and the possible solutions to that problem. The data also provide useful information about the implementation of regulatory environmental programs. This is particularly salient to endangered species.

Behavioural Information Managers also need information on what people are currently doing, how people intend to behave, and predicting what people might do in the future. Policy makers must be able to assess the probability of supportive behaviours in order to develop and implement effective conservation strategies (Humphery et al., 1977). One of the most common and efficient methods of estimating the probability of supportive

behaviour is through attitudinal data. This is a ubiquitous phenomena in the context of political behaviour.

12.3 Building an *Attitude toward Environmental Target* Framework

Deciding on the relevant level of analysis, choosing a suitable definition and concept of attitudes, finding an appropriate attitude/behaviour model, adapting existing attitude scales and developing new ones, and addressing a number of methodological considerations, have been essential to the process of building an attitude framework that is both pragmatic in terms of the requirements of environmental management and theoretically sound.

12.3.1 Clarifying Level of Analysis

> Different methods of studying attitudes can be likened to looking through a microscope at different levels of magnification (Tetlock, 1989, p.129).

Tetlock goes on to describe costs and benefits of his proposed three levels of magnification as they relate to the analysis of attitudes. The most intense or highly magnified level, one involving exceedingly controlled experimental studies, provides details of the attitude phenomenon, but at the cost of a broader contextual perspective. In less controlled experimental studies the magnification decreases, hence experimental control and measurement precision are sacrificed for the monitoring of complex, naturally occurring psychological process. In interview studies, where there is no experimental control, contextual perspectives are provided at the cost of internal validity and subsystem detail.

The level of analysis of attitudes adopted in this chapter equates with Tetlock's least intense level of magnification. At this level it focuses on individual understandings, individual attitudinal constellations as measured by attitude toward discrete objects and issues as opposed to shared understandings, which are measured in terms of underlying belief systems and value orientations (see Chapter 13).

12.3.2 Defining Attitudes

Choosing a suitable definition of attitudes was the second objective in the process of building this framework of *attitude toward environmental targets.* An attitude is a very complicated entity composed of a heterogenous array of thoughts, feelings, behavioural dispositions and other responses relevant to the attitude object (Eagly & Chaiken, 1993; Ostrom, 1989; Zimbardo & Leippe, 1991). As such it has the potential of being analysed along a number of dimensions. A challenge for this research has been to choose a suitable definition of attitude, one that encompasses the broad but critical notion of *evaluation*, a key component of "understanding". The definition of attitude found to be most adequate has been adopted from Eagly and Chaiken (1993):

> Attitude is a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor" ... where ... "*psychological tendency* refers to a state that is internal to the person, and *evaluating* refers to all classes of evaluative responding, whether overt or covert, cognitive, affective, or behavioural. (p.1)

In defining attitude in this way, Eagly and Chaiken provide a construct that is very general and abstract as opposed to one confined within the framework of particular psychological processes. However, they also acknowledge the criticisms directed toward this definition and counter criticisms such as "less objective" with "equally objective" because of the use this concept makes of a variety of objective indicators.

An Evaluative Structure as the Conceptual Property of Attitudes The Eagly and Chaiken definition of attitude highlights its *evaluative* structure. This is considered a critical feature of the construct in defining its use in this research. It is also a conceptual property of the construct which is used extensively in attitude research (Eagly & Chaiken, 1993; Fazio, 1989; Ostrom, 1989). Research has shown that *evaluation* is the way people 'understand', assign meaning to the entities in their world (Eagly & Chaiken, 1993; Ostrom, 1989; Pratkanis, 1989; Pratkanis & Greenwood, 1990).

The *evaluative* nature of attitudes also has important measurement implications, for example, the scaling response along an *evaluative* continuum can be used to operationalise the attitude concept (Pratkanis, 1989). *Evaluation* was central to Thurstone's approach to attitude measurement, one of the first theorists to address issues of interdependence of attitude theory and measurement (Ostrom, 1989). Thurstone's measurement of attitude and those later developed by Likert and Guttman, focused on the distribution of subjective attitudinal responses on an *evaluative* dimension. These responses enabled researchers to

systematically study the determinants and correlates of an attitude's *evaluative* property and apply that to the analysis of individual and group differences.

In the bipolar view of the *evaluative* dimension, with its central or neutral point, it is possible to identify where the valance shifts from one pole to the other as well as the intensity of the view. This bipolarity feature of attitude "holds the most promise for predicting behavioural reactions toward the attitude object", according to Ostrom (1989), "because it relates directly to approach/supportive behaviours on the one hand and avoidant/antagonistic behaviours on the other" (p.21). This link between *evaluation* and the prediction of behaviour is also taken up by Eagly and Chaiken (1993). The assumption that attitude should be inferred on the basis of evidence of *evaluative* responding to a circumscribed entity, gives the precise and distinctive meaning to the concept which is central to the theoretical framework developed in this research.

12.3.3 Conceptualising Attitudes

As with attitude definitions, there is a daunting spectrum of ways in which attitude has been conceptualised by social scientists. Social psychology in particular offers several different perspectives. If the focus is restricted to the *environmental* domain there is still a substantial array of studies and measures to consider. Rather than offer a critical review of these different perspectives, two specific approaches to conceptualising attitudes are explored with the view of integrating key aspects of both in this research.

12.3.3.1 From Social Psychology - Tricomponent Attitude Concept

The pragmatics of measurement require that attitude theory specify what indicators should reflect the construct. The use of beliefs, perceptions, feelings/emotions, and intentions, as the composite index of attitudes proposed in this thesis, gives these variables a central, mediating role with respect to attitudes. This is consistent with the tripartite view which asserts that attitudes have *cognitive, affective*, and *conative* antecedents and consequences (Eagly & Chaiken, 1993; Greenwald, 1989 a; McGuire, 1989; Ostrum, 1989). These components of attitude deal with a single subject of thought projected on the three interrelated mental dimensions (McGuire, 1989). *Cognitive* processes involve thoughts and ideas about the attitude object conceptualised as beliefs, where beliefs are considered to be associations or linkages that people establish between the attitude object and various attributes. *Affective* processes involve the feelings or emotions people have in relation to

the attitude object. *Conative* processes involve people's actions or intended actions with respect to the attitude object (Eagly & Chaiken, 1993; Fishbein & Ajzen, 1975).

Although the three-component view of attitude has achieved widespread adoption, it is now not without its critics (eg., Cacioppo et al., 1989; Greenwald, 1989b; Pratkanis & Greenwood, 1990). Several active lines of criticism persist, some of which will be outlined. One has questioned the nature of the relationship between the three components (Greenwald, 1989a), another, whether in fact all three components are empirically distinguishable as three classes (Eagly & Chaiken, 1993), and a third, whether an attitude must have all three components at formation or responding (Eagly & Chaiken, 1993). In spite of the critics and the alternative proposals, McGuire (1989) believes that the extensive and pervasive use of this tricomponent analysis in the past, together with some methodological improvements, makes its future use likely. Eagly and Chaiken (1993) agree, emphasising the important conceptual framework the tripartite distinction provides. Considering the limitations presented by the critics and the justifications of use conferred by prominent psychologists such as McGuire, Eagly and Chaiken and many others in the field, this research has adopted the tripartite conceptual definition. For this environmental study the definition outlined provides a clear and pragmatic conceptual framework by which the attitude construct can be measured and situated into a sound theoretical attitude/behaviour model. It is also the case that this is a user-friendly model which nonpsychologists can understand and use. And, it has clear and logical implications in terms of measurement and application.

Attitudes as a coherent structure of beliefs/ perceptions, feelings/emotions and behavioural intentions, serve as an index of individuals' thoughts and feelings about the issues in their environment - a complex mental representation of these issues (Zimbardo & Leippe, 1991). In addition, attitudes provide clues to future behaviour, predicting how people will act when they encounter the objects of their beliefs (Deaux & Wrightsman, 1988). Rather than endorsing the view of cognition, affect and intention as autonomous, noninteracting systems, i.e., cognition-based, affect-based (Edwards, 1990), and intention-based attitudes (Eagly & Chaiken, 1993), this study resonates more with the synergistic view that cognition, affect and intention are interdependent, interacting systems (Zimbardo & Leippe, 1991), and that "attitude can be formed primarily or exclusively on the basis of any one of the three types of processes" (Eagly & Chaiken, 1993, p.16).

12.3.3.2 From Environmental Management - An 'Attitude toward Wildlife' Model

Kellert's (1992, 1996) model is essentially an atheoretical framework that proposes that attitudes toward wildlife are the consequence of four interrelated factors (Figure 12.1).

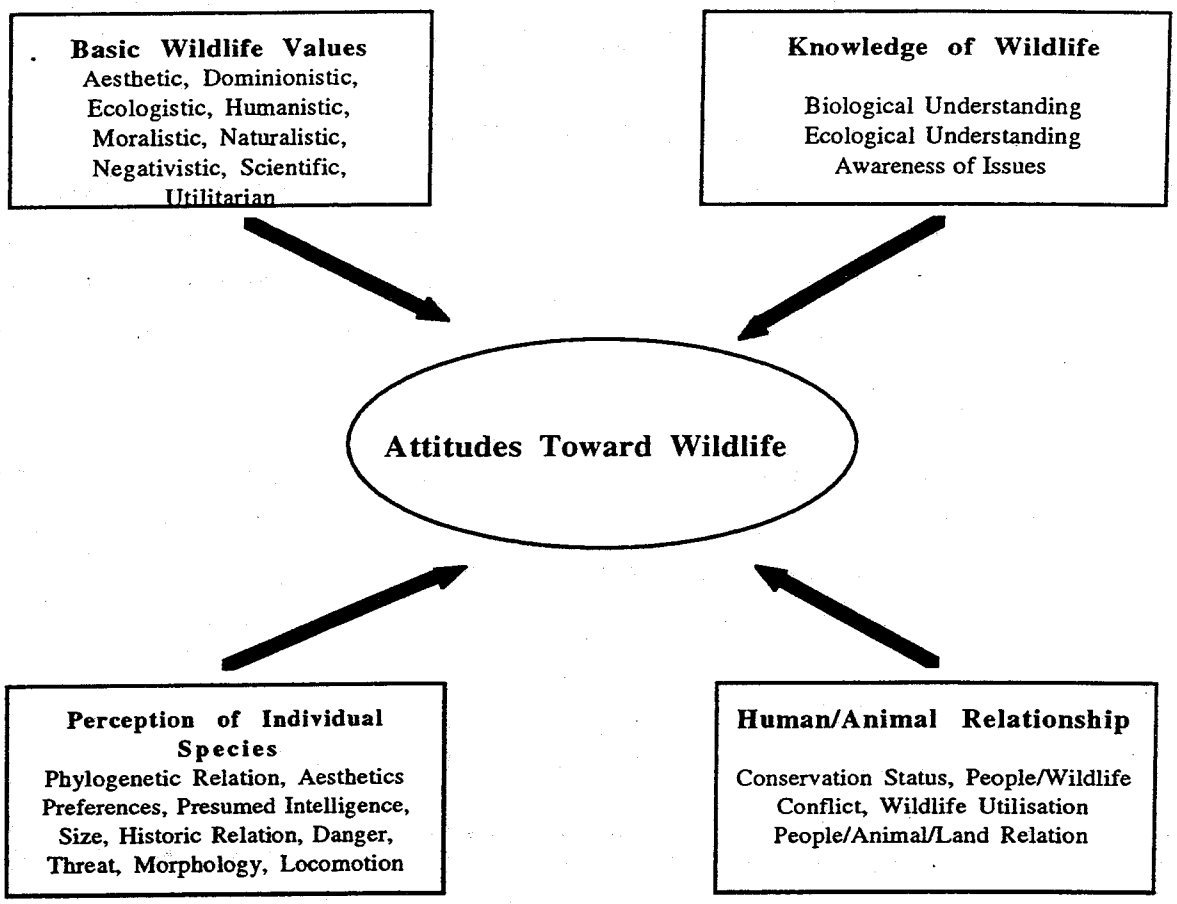

Figure 12.1 Factors affecting attitudes toward wildlife. (Source: Kellert, 1992,1996)

The first of these factors includes basic wildlife attitude/values. Here Kellert has identified nine underlying attitude types: utilitarian, naturalistic, ecologistic-scientific, aesthetic, symbolic, dominionistic, humanistic, moralistic, and negativistic. According to this model, attitudes toward wildlife are also influenced by the perception people have of particular physical and behavioural characteristics of target species, including size, aesthetic appeal, presumed intelligence, sentience, cultural and historical familiarity, morphological features, and movement. The use of public perceptions in this way appears to be linked to early research conducted by Paulhus and Dean (Kellert, 1983),

who found that public perception of animals according to intelligence, size, perceived harmfulness and aesthetic appeal influenced people's protective feelings toward those animals.

The third influence on attitudes toward wildlife is the knowledge people have of the target species. Kellert's use of knowledge has been based on what he defines as three types of cognitive understanding, biological understanding, ecological understanding, and awareness of issues. The fourth influence on attitudes toward wildlife is human/animal relationships. This factor consists of four components: conservation status, people/wildlife conflict, wildlife utilisation, people/animal land relations. In various North American studies on bears each of these components was seen to affect attitudes toward this species (Kellert, 1992). For example, actual and perceived people/wildlife conflicts, which involved direct conflict such as threat to human safety and indirect conflict such as competition for land and resources, were found to be important in attitude formation.

Despite an exclusive emphasis on empirical evidence as a means of justifying these four attitude factors, rather than a sound human behavioural or social psychological theoretical base, this model provides important information that can be incorporated into the tricomponent model of attitude developed in social psychology.

12.3.4 The Composite Attitude-Behaviour Model

In building this *attitude toward environmental target* framework, the fourth objective was to situate the attitude concept into a theoretical framework that links attitude to behaviour. After all, the single most important reason for this focus on attitude is the knowledge that attitudes and behaviours are linked. For environmental managers who are primarily concerned with changing destructive environmental activities and promoting sensitive and responsible behaviour, such links are critical. As behaviour change agents, managers need to understand the underlying psychological processes by which attitudes serve as causes of behaviour and therefore, in order to change behaviour, how they need to change attitudes. The most significant of the contemporary theories developed in the effort to understand this underlying psychological process is Eagly & Chaiken's (1993) composite model (see Figure 12.2).

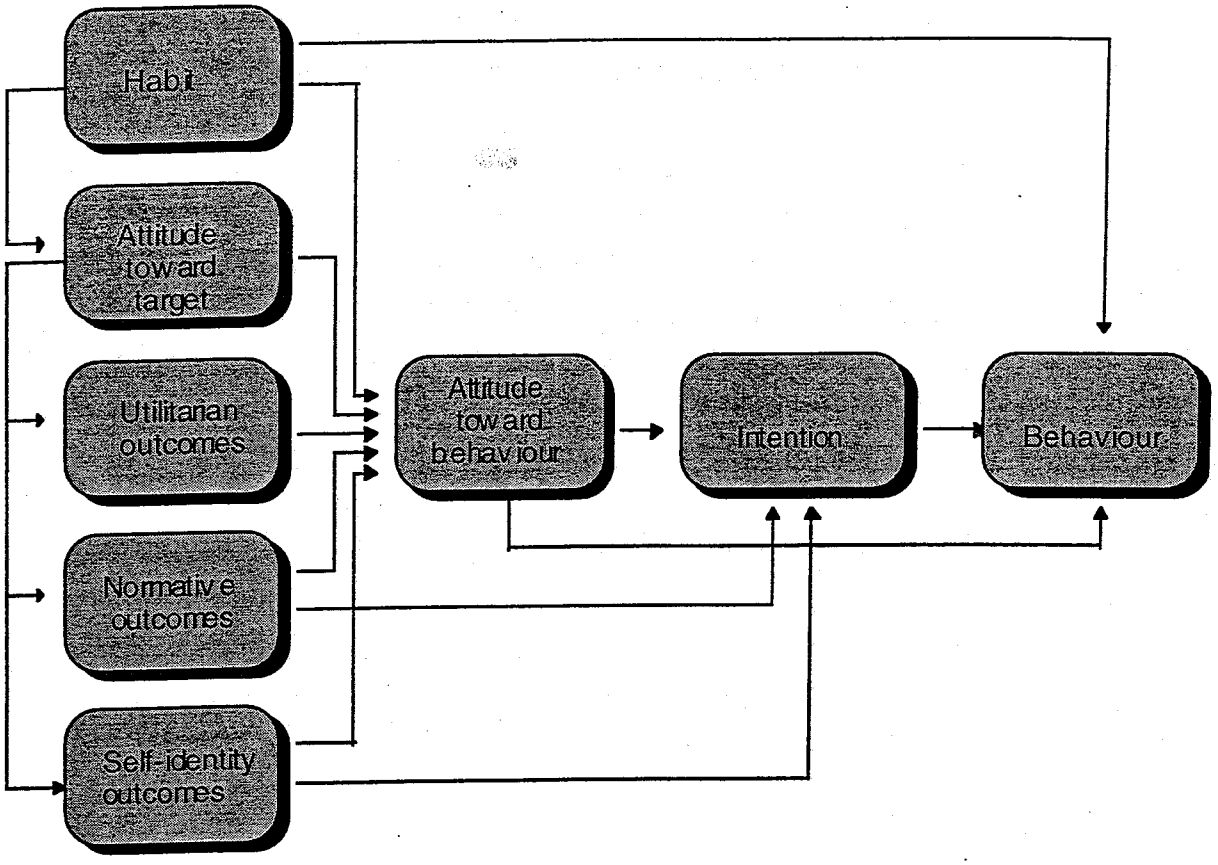

Figure 12.2 Composite Attitude-Behaviour model. (Source: Eagly & Chaiken, 1993)

In this model, attitudes toward the target together with the activation of habits and the three anticipated outcomes of behaviour categories (utilitarian, normative and self-identity), determine behaviour. Unlike previous models, this model places attitudes within a theoretical structure that includes these nonattitudinal determinants. Habits are understood to be automatic sequences of behaviour, attitudes toward targets are considered as evaluations of targets of behaviour, and the three outcome factors are the anticipated consequences of behaviour.

All of these factors could impact on attitudes toward the behaviour and so, as outlined in the model, can be directly linked to it. A subjective assessment is often required to link attitude toward behaviour with intention. In some situations this link is by-passed and instead attitude toward behaviour is directly linked to behaviour itself. The intention-

behaviour linkage is seen to require cognitive processes in evaluating the various routes to engaging in the behaviour. Understanding the causes of behaviour requires an understanding of the role played by attitudes in mediating actual behaviour.

In the context of this research this model provides an important theoretical framework for the analysis of the attitude-behaviour relation which will be addressed in the final chapter of this study. The relevance of this model to this chapter is that it highlights the importance of attitudes, attitudes toward targets (i.e., attitudes toward the entities to which behaviours are directed), as playing a direct and dynamic role in mediating and moderating behaviour.

12.3.5 Operationalising *Attitudes toward Environmental Targets*

Within the confines of the theoretical definition and concept of attitudes outlined, attitudes were measured in this research using evaluative responses to cognitive, affective, and conative indicators.

12.3.5.1 The Cognitive, Affective, and Conative Indicators

In this research, the cognitive aspect of *attitude toward environmental targets* corresponds with the *evaluative* attitude structure concept proposed by Eagly and Chaiken (1993) and outlined in Section 12.3.3.1. The reasons for considering the cognitive aspect of attitude are twofold. Firstly, because the *cognitive evaluative* structures of attitude are " laden with good-versus-bad meaning " they are "very likely to be infused with *affect* and to energise and direct *behaviour*" (Eagly & Chaiken, 1993, p.18). Secondly, the attitude-behaviour relationship, premised on the assumption that attitudes have *cognitive*, *affective* and *conative* aspects, has been explored extensively.

Traditionally, the affective component of attitudes has included *feelings*, *emotions* or *drives* associated with an attitude object (Eagly & Chaiken, 1993; Edwards, 1990; McGuire, 1989). These affective responses can range from extremely positive to extremely negative, and hence be located on an evaluative dimension of meaning (Eagly & Chaiken, 1993). Affect has been used as a generic term for a variety of motivational and emotional constructs and other mechanisms that do not fall clearly within the domain of cognition. It is the experiential component of emotion that is central to this research.

Behavioural responses such as the intention to act can also serve as an indicator of attitude (Eagly & Chaiken, 1993; McGuire, 1989), since it is related to the dimension of favourability-unfavourability toward the attitude target. Positive or favourable evaluations are related to holding supportive intentions in relation to the target of the attitude. Another behavioural measure which has been used as a conative indicator of attitude is past behaviour (Zimbardo & Leippe, 1991). However, as Eagly and Chaiken (1993) point out, "whether a person performs an act, in and of itself, cannot necessarily be regarded as a valid indicator of attitude" (p.63).

A cautionary note with regards to this tricomponent attitude structure which has been adopted by this research is warranted at this stage, as it has implications for the analysis of the data set. Although the various findings of previous research generally support the separability of the three classes of evaluative responses, cognitive, affective, and conative, it appears that a definitive empirical determination of the dimensionality of these responses is unlikely since they will vary as a function of various modes of presentation of the attitude object, nature of response measures, and the type of attitude object (Eagly & Chaiken, 1993). Since it is difficult to empirically distinguish the three classes of attitude, the tricomponent view would appear inappropriate. Nonetheless, this view has been adopted essentially for its provision of an important conceptual framework and a convenient way of thinking of, defining, and measuring attitudinal responding particularly in this environmental domain. In addition, each of these classes of attitudes has important implications for behaviour. Since the definitions of the three categories of attitudinal responding are theoretically distinct an analysis of the three classes of responses was justified on this basis.

12.3.5.2 The Attitude toward Wildlife Indicators

Those aspects of Kellert's model which readily fit into the theoretical framework of Eagly and Chaiken's (1993) tricomponent view were adopted. This included concepts from 'basic wildlife attitudes/values' and 'perception of individual species'. Although this researcher agrees with Kellert that 'knowledge of wildlife' is an important factor which can shape attitudes, it was not considered as a attitudinal variable or component in the present research context. As a consequence, "knowledge" did not form part of the composite index of attitude toward the target. Rather, it was analysed separately, but its relation to attitude toward the target was explored. The "human/animal relations" factor was also not considered as an attitudinal variable. Instead aspects of this factor were adopted for the construction of the environmental concern construct (Chapter 14).

In addition to these concepts, Kellert's model provided a previously developed and extensively used attitude typology scale. In its original format this scale consists of nine attitude categories, *Aesthetic, Dominionistic, Ecologistic and Scientific, Humanistic, Symbolic, Utilitarian, Moralistic, Naturalistic, and Negativistic.* Although items from most of these categories were included they were not analysed according to the category structure. Rather, in line with the tricomponent view and the notion of favourable as opposed to unfavourable evaluation of attitudes, these items together with other self-constructed items were combined to provide a composite index of attitudes which included cognitive, affective, and conative components.

12.3.5.3 Attitude Domains

A consistent theme evident throughout this study is the distinction between that which is *specific* and that which is *general.* This issue of general versus specific has been discussed in detail in the previous chapter. Suffice it to say here that in this chapter attitude is operationalised according to a specific and local issue, the cassowary, and a general and national issue, 'other' Australian wildlife.

12.3.5.4 Attitude Scales

Twenty-eight items from the original 62-item Kellert scale (Kellert, 1989) were chosen and adapted to suit the subject matter of this inquiry. In addition, several open-ended questions were incorporated. The resultant composite index of attitudes consisted of two **attitude toward environmental target** scales, ***attitude toward cassowaries***, and ***attitude toward 'other' wildlife.*** Items in both these scales were coded such that a high score indicated a favourable or positive evaluation.

Attitude toward cassowaries A nineteen-item composite index (Appendix B.2.1) contained twelve items from Kellert's *Libertarian, Aesthetic, Scientistic, Negativistic, Utilitarian* , and *Moralistic* attitude categories, and seven perception of individual species items developed specifically for this research. Five-point Likert response formats were used. An item analysis, item-total score correlations was conducted to check the items (Himmelfarb, 1993). Following this process, one item was discarded which left the remaining nineteen items with item-total score correlations ranging from 0.30 ($n = 320$, $p < 0.01$) to 0.72 ($n=320$, $p < 0.001$).

Attitude toward 'other' wildlife Thirteen items from Kellert's attitudes categories were included, together with two perception of individual species items (Appendix B.2.2). The species chosen to represent the wildlife category was the wallaby, a common and familiar species to the majority of Australians. This resulted in a fifteen item composite index of attitudes toward wildlife. Five-point Likert response formats were used. An item analysis confirmed the use of all fifteen items. Item-total score correlations ranged from 0.23 ($n = 320$, $p < 0.05$) to 0.66 ($n=320$, $p < 0.001$).

A broader understanding of these composite indices of attitude is explored with the addition of nonevaluative open-ended responses, examples of which are included in the appropriate sections. Rather than adding to the attitude score through content analysis, these responses have been included with the aim of providing a way for respondents to express themselves in their own way and hence adding to the researchers' understanding of the individual attitude responses.

12.4 Results and Discussions

This part of the chapter outlines and discusses results of the analyses of *individual* representations and understandings of the natural environment primarily using the attitude concept. 'Information' level which has been used in previous research as an indicator of attitude is analysed separately. The following general questions are addressed in this analysis.

1.	What are the individual's understandings of the natural environment and cassowaries as represented by the attitude concept.
2.	What are the environmental-contextual and social-situational dimensions of these understandings and the extent of contact and involvement with the natural environment and cassowaries?
3.	What are the relationship between these understandings?
4.	What are the implications of this analysis for endangered species recovery and environmental management?
5.	How are these understandings related to underlying belief/value systems, environmental concerns, and environmentally responsible behaviour?

Note: Questions 5 is addressed in Chapter 15.

12.4.1 A Profile of Respondents' *Attitudes toward Cassowaries*

12.4.1.1 General Outline

Respondents' *attitudes toward cassowaries* , was moderately favourably [mean ± SD = 72.72 ± 11.44 (Appendix B.2.3); standardised mean ± SD = 3.83 ± 0.60]. Eight percent of respondents scored below 57[3] which is within a medium-low or unfavourable attitude range. Of the three attitude components, the cognitive component evidenced the highest standardised mean score (standardised mean ± SD = 3.95 ± 0.59), followed by the affective component (standardised mean ± SD = 3.85 ± 0.73), and the conative component (standardised mean ± SD = 3.29 ± 1.09) (Figure 12.3).

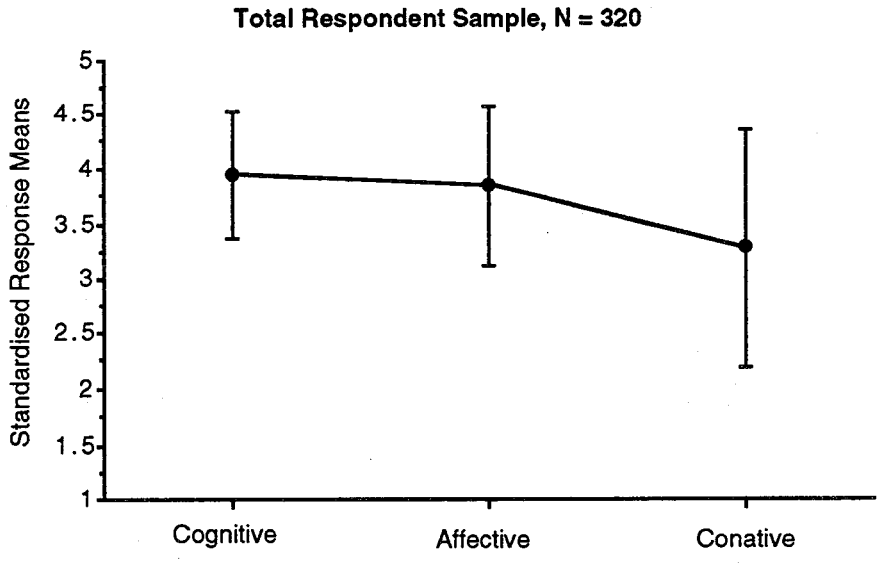

Figure 12.3 Standardised[4] response means (± SD) for *Attitude toward Cassowaries.*

[3] 38 to 57 is in the medium-low score range suggesting an unfavourable attitude.

[4] The process of *standardisation* or *norming* (Neuman, 1997) provides for the assessment of the relative endorsement level of each attitude dimension (for further explanation see Appendix B.3.6).

Intercorrelations between the three attitude components and the composite attitude score Significant intercorrelation was evident between the three attitude components (Appendix B.2.4). The high correlation between cognitive and affective components [r (n = 320) = 0.54, p < 0.001] may well reflect the fact that these two classes are neither distinct nor exclusive (see Section 12.3.5.1). However, the strong correlations between these two components and the conative indicator would suggest that respondents with heightened cognitively/emotionally based *attitudes toward cassowaries* are more likely to hold supportive intentions toward this species. The theoretical definition and style of questioning for this attitude indicator was sufficiently distinct to enable a clear separation between conative and cognitive / emotionally based attitudes. The attitude components - composite score correlations ranged from 0.66 (n = 320, p < 0.001) to 0.92 (n = 320, p < 0.001). The reliability and construct validity of the *attitudes toward cassowary* index, the calculation of a composite attitude score, and separate attitude components scores find modest support in this correlation analysis and the previous item-total correlations.

12.4.1.2 Environmental- Contextual Dimensions

Resident Communities All resident communities expressed a favourable *attitude toward cassowaries*. The most favourable was expressed by semiurban residents (mean ± SD = 76.16 ± 10.38), followed by rural (mean ± SD = 73.69 ± 12.05), and urban residents (mean ± SD = 69.01 ± 11.25) (see Appendix B.2.3). On the basis of post hoc group comparisons, the composite attitude score for urban residents was significantly less than that of semiurban and rural residents [F(2,317; n = 319) = 15.29, p = 0.0001; Fisher's PLSD; *F*max = 1.35]. This result is contrary to previous research which found clear urban/rural distinctions, but in the opposite direction, that is, rural residents tended to hold less favourable attitudes toward animals than urban residents (Kellert, 1996).

Although the high standard deviation for the rural residents (Appendix B.2.3) would suggest a greater variability in individual responses, highlighting the diversity of individual opinion within this community, only 2.8% of these residents scored below 57 compared to 14.1% of urban residents. The attitude components of this score for which there were significant differences between resident communities included both the cognitive component [F(2,317; n = 319) = 3.35, p = 0.0362; Fisher's PLSD; *F*max = 1.47], and the affect or emotional component [F(2,317; n = 319) = 26.52, p = 0.0001; Fisher's PLSD; *F*max = 1.56]. These results suggest that the less favourable urban *attitudes towards cassowaries* is the result of a weaker cognitive and emotional

connection to this species that these residents have as compared with the other two resident communities. The conative attitude component evidenced no significant difference between the communities (Figure 12.4).

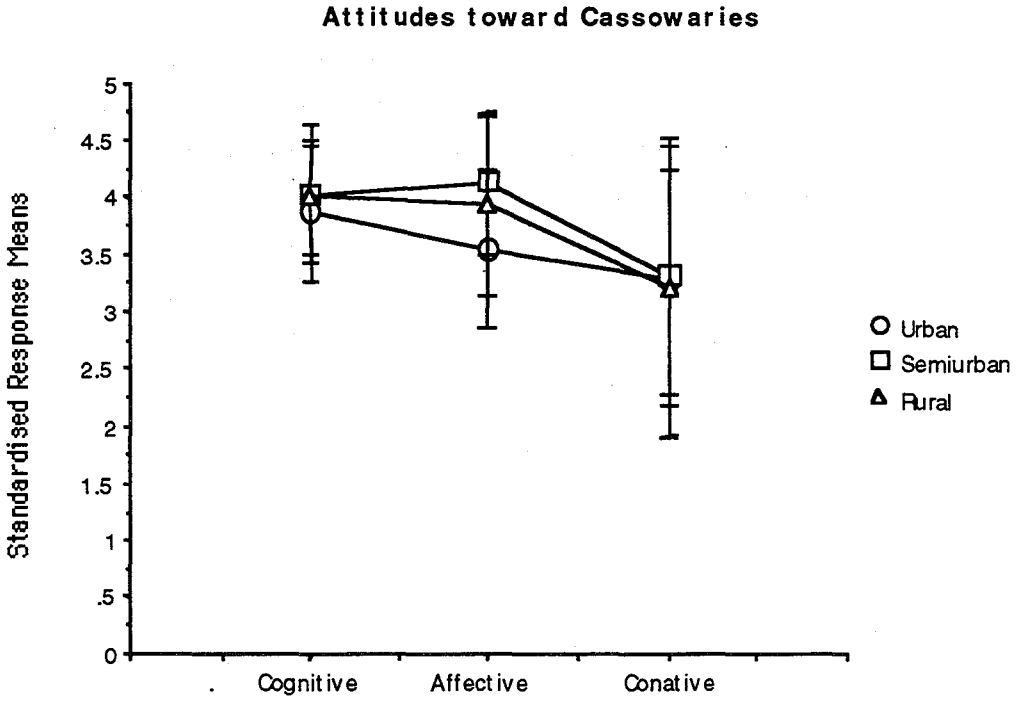

Figure 12.4 Resident community differences in *Attitudes toward Cassowaries.*
(Standardised response means ± SD)

It is interesting to note that despite the weaker cognitive and emotional connections, urban residents express an equivalent intentional or motivational connection to that expressed by the other resident communities. This would imply that their intentions to act supportively toward cassowaries was independent of their cognitive or emotional connection to the species or that other factors mediate and/or moderate behavioural intentions, for example, physical distance and the fact that their everyday life activities do not include encounters with cassowaries.

Respondents' Direct Experience Cassowary habitation of the proximate environment is presumed to be linked to an increase in respondent exposure to the species, either in the context of sighting the birds or with respect to other physical encounters. On this basis both semiurban and rural residents should be considerably more likely than urban residents to directly and repeatedly experience cassowaries within the time frame of one year prior to the survey being conducted. Responses to questions which addressed this topic confirmed this assumption. Semiurban and rural residents were significantly more likely to directly encounter cassowaries in the wild than urban residents [χ^2 (2, n = 317) = 166.13, p = 0.0001 (Cramer's V = 0.72)]. They were also significantly more likely to repeatedly experience cassowaries in the wild [χ^2 (2, n = 317) = 153.82, p = 0.0001 (Cramer's V = 0.70)]. Sixty-two percent of semiurban and 60 percent of rural residents recorded having sighted cassowaries at least every two months.

The composite *attitudes toward cassowaries* score differed significantly according to the direct experience residents had with cassowaries in the wild [t (315, n = 317) = 3.45, p = 0.0006]. This was also evident for the cognitive component [t (315, n = 317) = 2.06, p = 0.0398], and affective component [t (315, n = 317) = 4.31, p = 0.0001] of attitudes. However, differences in responses are less than would be expected (Figure 12.5).

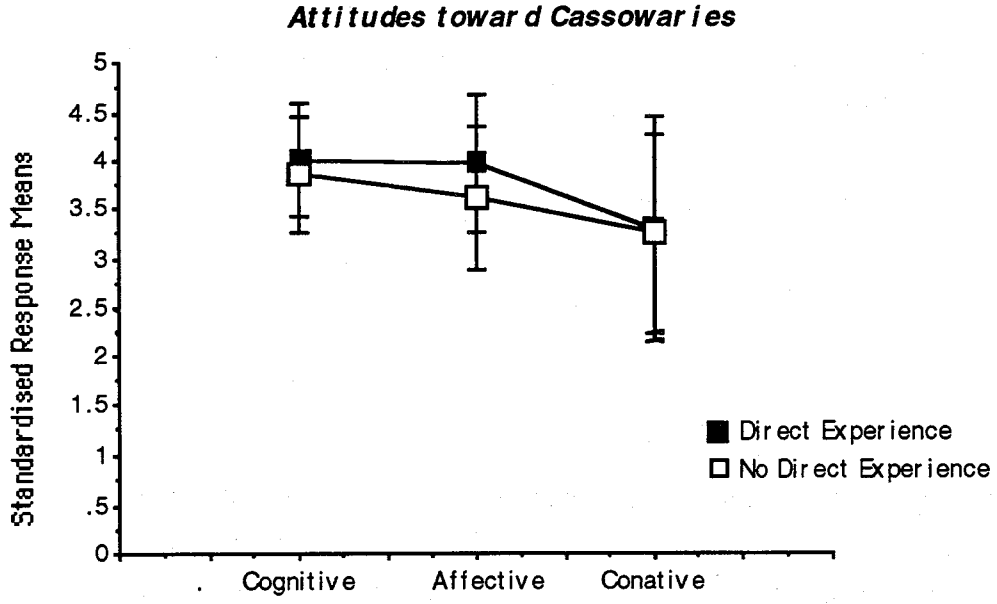

Figure 12.5 Effect of direct experience on *Attitude toward Cassowaries.*

(Standardised response means ± SD)

One possible explanations is the high symbolic profile of the species, although for the conative component there was a polarity in the responses (mean ± SD = 3.30 ± 1.15) which is lost in the mean comparisons. There was also a significant difference evident in *attitudes toward cassowaries* according to repeated experience with cassowaries [t (315, n = 317) = 3.50, p = 0.0005], that is, those who had either never seen a cassowary or who had only seen one once were evidencing significantly lower scores than those who had seen one at least twice per year.

These results could partially explain the significantly lower favourability score for *attitude toward cassowaries* that urban residents expressed. Urban residents are not exposed to the every day environmental circumstances experienced by semiurban and rural residents, which inevitably increases their chance of directly and repeatedly encountering cassowaries in the wild. An emotional connection with cassowaries was the only attitude component for which a significant difference according to direct experience [t (315, n = 317) = 4.28, p = 0.0001], and repeated experience [t (315, n = 317) = 4.44, p = 0.0001], was evidenced, with both heightening this connection significantly. For example, 60% of respondents who had directly experienced cassowaries recorded the highest score (rating = 5) for how much they *liked* cassowaries, as compared to 36% of respondents with no direct experience.

These analyses of the environmental-contextual dimension of individual responses to *attitudes toward cassowaries* suggest that, in general, respondents who have a high degree of interaction with the natural environment, for example, rural and semiurban residents are prone to direct and repeated experiences with inhabitants of that environment such as cassowaries, which in turn heightens their positive evaluation of cassowaries, particularly their emotional evaluation.

12.4.1.3 Social-Situational Dimensions

Gender There were no apparent differences between male and female respondents with respect to the composite attitude score [t (318, n = 320) = 0.47, p = 0.639], and the three attitude components on the basis of post hoc group comparisons.

Age No significant relation was found between the composite *attitudes toward cassowaries* score and age [r (n = 317) = 0.12]. Notwithstanding this finding, a closer examination of the relation between age and the attitude score using cohort analysis was undertaken. Such an examination provides a more detailed view of

the age-attitude relation according to designated cohorts, potentially identifying a response pattern associated with these cohorts. Both ten and five year cohorts were examined. According to the ten year cohort analysis, the lowest scores were expressed by the very young, the middle aged, and the very old (Table 12.1). The highest score was expressed by the 65 to 74 year group. There was not significant difference between any of the age cohorts and their attitudes toward cassowaries.

Table 12.1 Ten year cohort analysis of *Attitude toward Cassowaries.*

10 year cohort	n	mean	± SD
16-24	49	70.67	± 11.34
25-34	67	72.16	± 12.61
35-44	67	74.36	± 10.68
45-54	65	71.63	± 11.70
55-64	27	73.67	± 9.88
> 65	38	77.75	± 8.96

Education Significant differences emerged between education levels and *attitudes toward cassowaries* [F (3,314; n = 317) = 5.11, p = 0.0018; Fisher's PLSD; *F*max = 1.34] (see Appendix B.2.5). Respondents with the lowest (primary) and highest (university) level of education expressed significantly less favourable *attitudes toward cassowaries* than those with a secondary or TAFE level of education. Scores for two attitude components were also significantly different across education levels (Figure 12.6). Primary and university educated respondents had significantly lower scores than TAFE educated respondents for the cognitive component [F (3,314; n = 317) = 3.63, p = 0.0134; Fisher's PLSD; *F*max = 0.69], and for the affective component [F (3,314; n = 317) = 4.88, p = 0.0025; Fisher's PLSD; *F*max = 0.75].

In summary, primary and university educated respondents expressed the least favourable attitudes overall. In general, these results do not support findings from previous research which suggest that higher educated respondents have more positive attitudes to environmental issues. Too broad a grouping of education levels may in part explain this discrepancy. Without the distinct division between a college (TAFE) education as opposed to a university education, this considerable difference in attitude scores at this highest level of education would have been lost.

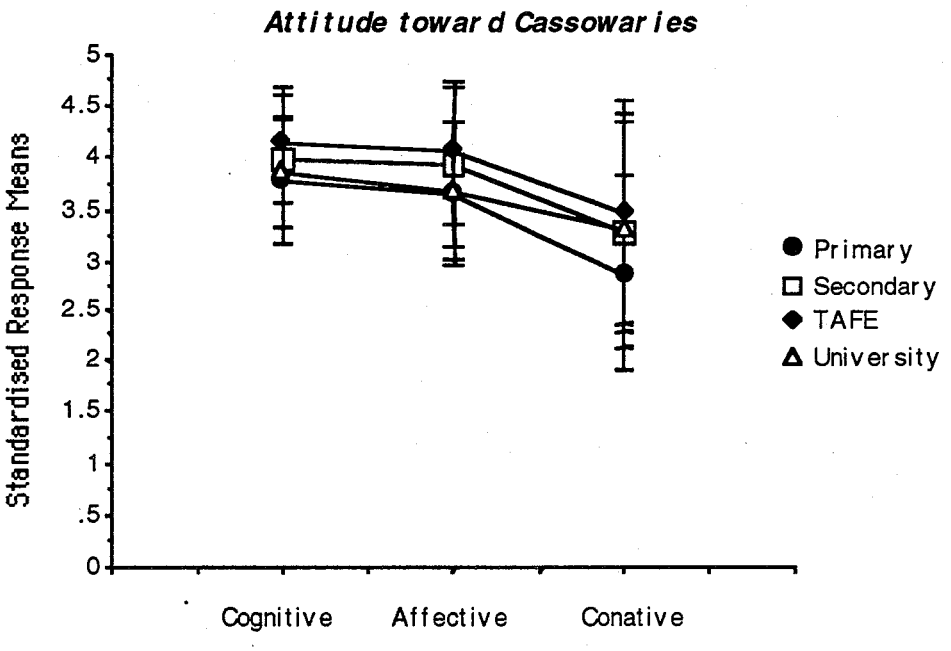

Figure 12.6 Education level differences in *Attitudes toward Cassowaries.*

(Standardised response means ± SD)

Income Income level findings suggest that respondents with incomes below $20,000 are significantly more favourable in their *attitudes toward cassowaries* than those with incomes above $30,000 [F (5,286; n = 291) = 2.58, p = 0.0263; Fisher's PLSD; *F*max = 1.84] (see Appendix B.2.6). Respondents with incomes below $30,000 held significantly more favourable emotionally-based attitudes than those with incomes above this figure [F (5,286; n = 291) = 3.66, p = 0.0032; Fisher's PLSD; *F*max = 0.58].

Years of Residence[5] The composite *attitudes toward cassowary* score was not significantly related to number of years living in the community [r (n = 316) = 0.02]. Residential status was then divided into two categories. New residents were defined as those who had lived in the study area for less than ten years, and long-term residents as those who had lived in the study area for ten years or more. This

[5] Years lived in a community has been used in a number of rural studies as an indicator of environmental attitudes (e.g., Fortmann & Kusel, 1990; McBeth & Foster, 1994). A central tenet of rural social theory is that native or long-term rural residents have an outlook that is more conservative compared to new residents (McBeth & Foster, 1994). This assumption is explored in this study but not confined to the rural resident group. Rather the whole of the study population was addressed.

categorisation was based on Fortmann and Kusel's (1990) proposal that the ten year cut off point assumes that "people who have remained in an area for ten years may have been socialized to local attitudes" (p.217). New residents evidenced a slightly lower favourability level (mean ± SD = 72.17 ± 11.57; n = 210) compared to long-term residents (mean ± SD = 74.34 ± 10.59; n = 106), which is contrary to the rural social theory assumption (McBeth & Foster, 1994). However, these scores were not significantly different according to residential status [t (314, n = 316) = -1.62, p = 0.1068].

Group Membership No statistically significant difference across group membership was evident [t (314, n = 316) = -0.07, p = 0.9415]. Those who were affiliated with groups such as community / business / service / tourist / farmers / church / sport / conservation etc., expressed the same level of attitude favourability as those who had no group affiliation. This finding also applied to the attitude components. When the type of group association was broadly divided into conservation, 'other', or no group membership, again no significant differences were found [F (2,317; n = 319) = 0.70, p = 0.4988; Fisher's PLSD; F_{max} = 1.22]. This would suggest that respondents who are members of conservation groups are no more likely to express favourable *attitudes toward cassowaries* than those who belong to the 'other' organisations, or those who do not have any group affiliation. This finding is perhaps not so surprising considering that 68% of respondents considered themselves to be environmentalists in spite of not belonging to a conservation organisation[6]. This was also the response pattern for the attitude components.

Respondents with no group affiliation evidenced the highest score (mean ± SD = 6.65 ± 2.18). A possible explanation for these finding would be that a favourable evaluation of cassowaries is so widespread that the range of individual responses across group and non-group members is similar. In this instance it appears that in the past such differences and similarities have been exaggerated. Notwithstanding the apparent lack of influence of group membership characteristics, 59% of respondents indicated that their opinions had been influenced by the attitudes of other people in the community.

Taken together, these findings suggest that a moderately positive evaluation of cassowaries is fairly widespread across the respondent population. The picture which

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[6] This included ratings 4 and 5 when asked "Would you consider yourself an environmentalist?"

emerges from these results suggests that primary and university educated urban residents who have no direct experience with cassowaries hold the least favourable attitude toward this species. The surprising results included the low attitude scores for urban residents, the low scores for the university-educated respondents, and the lack of association between conservation group membership and the attitude scores. These particular results are contrary to the reported findings of previous studies and will be discussed in the last section of the chapter.

12.4.2 A Profile of Respondents' *Attitudes toward 'Other' Wildlife* [7]

12.4.2.1 General Outline

Respondents generally expressed favourable *attitudes toward 'other' wildlife* (mean ± SD = 49.50 ± 7.71) (see Appendix B.2.8). However, when standardised, the composite attitude score for wildlife (standardised mean ± SD = 3.54 ± 0.55) was significantly lower than that for cassowaries (standardised mean ± SD = 3.83 ± 0.60) [t (df = 319) = 7.87, p = 0.0001], suggesting that cassowaries are more *salient* than general wildlife. For the three attitude components, the score was highest for the cognitive component (standardised mean ± SD = 3.95 ± 0.61), declining to the affective (standardised mean ± SD = 3.45 ± 0.73), and conative component (standardised mean ± SD = 3.12 ± 0.84) (Figure 12.7). This particular response pattern was the same as that evidenced for *attitudes toward cassowaries* (see Figure 12.2).

Intercorrelations between the three attitude components and the composite attitude score Each of the three attitude components was significantly intercorrelated (see Appendix A.2.7). As with *attitudes toward cassowaries* scores, the strong correlation between cognition/affect and behavioural intention suggests the distinct link between them. However, as indicated earlier, due to the possibility of overlap between cognitive and affective components, correlation between these two may partially reflect the lack of a clear distinction. The attitude component intercorrelations ranged from 0.75 (n = 320, p < 0.001) to 0.77 (n = 320, p< 0.001). This correlation analysis and the previous item-total correlations provide support for the reliability and construct validity of the *attitudes toward 'other' wildlife* index, the reasonableness of a total attitude composite index, and individual scores for separate attitude components.

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[7] In addition to providing important information on respondents' attitudinal perspective of wildlife, this analysis allows for a 'situating' of *attitudes toward cassowaries* with respect to other species.

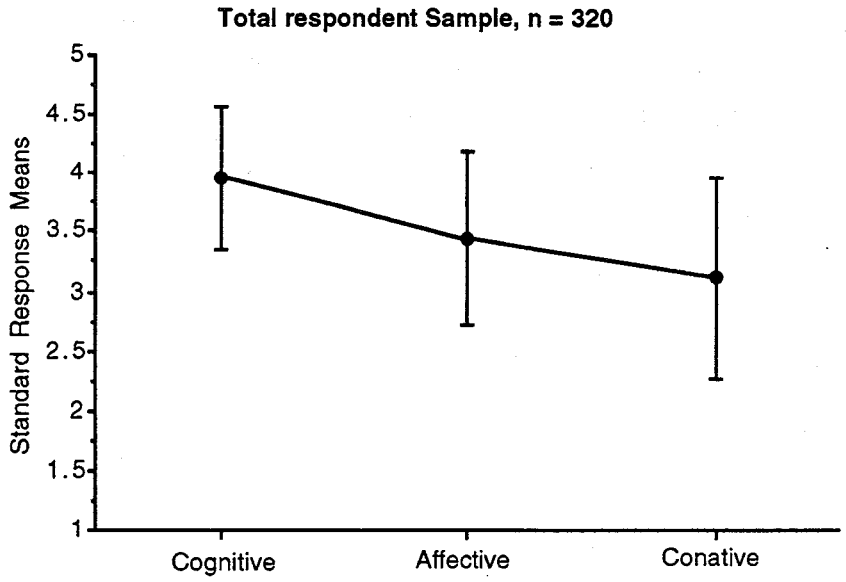

Figure 12.7 Standardised response means (± SD) for the *Attitude toward 'Other' Wildlife.*

12.4.2.2 Environmental-Contextual Dimensions

Resident Communities Favourable *attitudes toward wildlife* were expressed by all resident communities (Appendix B.2.8). Those with the highest scores were the semiurban residents (mean ± SD = 49.85 ± 8.08), followed closely by the rural (mean ± SD = 49.29 ± 9.64), and urban resident community (mean ± SD = 49.20 ± 6.78). As evident from the proximity of scores, no significant differences existed between the three communities, a response pattern that differs significantly to *attitudes toward cassowaries* , where a clear distinction between resident communities was found. On closer examination of these scores for urban residents, the difference in the standardised means between *attitudes toward 'other' wildlife* (standardised mean ± SD = 3.51± 0.48) and *attitudes toward cassowaries* (standardised mean ± SD = 3.63 ± 0.59), was only 0.12 - not statistically significantly different [t (df = 141) = 1.68, p = 0.0961]. On the other hand, for the semiurban/rural comparison, there was a difference in means of 0.43, which achieve significance [t (df = 1770 = 9.51, p = 0.0001]: *attitudes toward 'other' wildlife* (standardised mean ± SD = 3.55 ± 0.60); *attitudes toward cassowaries* (standardised mean ± SD = 3.98 ± 0.57). This would suggest that, unlike semiurban and rural residents, urban residents view cassowaries in a similar light to other wildlife, rather than viewing them as a 'special' or 'salient' species. For the attitude components,

only the emotional component [F (2,317; n = 319) = 6.68, p = 0.0014; Fisher's PLSD; *F*max = 2.4], evidenced a significant difference, with urban residents evidencing a significantly less favourable emotionally-based *attitudes toward 'other' wildlife* than the other two resident communities. This particular aspect of the findings is consistent with that for *attitude toward cassowaries.*

Respondents' Direct Experience A direct experience with wildlife dimension was not measured. Potential for direct experience was inferred from residential status.

12.4.2.3 Social-Situational Dimensions

Gender There were no apparent differences between male and female respondents with respect to the composite attitude score [t (318, n = 320) = 0.97, p = 0.3353], and the three attitude components on the basis of post hoc group comparisons.

Age No significant relation was found between the composite *attitudes toward 'other' wildlife* score and age [r (n = 320) = 0.05]. This was also the case for the three attitude components. For the ten year cohort analysis a response pattern did emerge, but it was not as distinct as that for *attitudes toward cassowaries.* The difference between the lowest and highest mean scores was only 3.43, compared to 13.45 for *attitudes toward cassowaries.* The peaks and troughs in this data set were therefore not as prominent. The five year cohort analysis did identify the lowest scorers as the 16 to 19 year olds (mean ± SD = 48.29 ± 6.89, n = 14), the 45 to 49 year olds (mean ± SD = 47.12 ± 8.38, n = 34), and the 75 to 79 year olds (mean ± SD = 47.17 ± 8.82, n = 5), a response pattern that corresponded more closely to the *attitudes toward cassowaries* results.

Education Significant differences emerged between education levels and *attitudes toward 'other' wildlife* [F (3,314; n = 317) = 6.28, p = 0.0004; Fisher's PLSD; *F*max = 1.62] (Appendix B.2.9). TAFE educated respondents expressed a significantly higher level of favourability toward wildlife compared to all other education levels. In addition, primary educated respondent scores were significantly lower than those expressed by all higher education levels. Scores for all attitude components were also significantly different across education levels. Consistently, TAFE educated respondents evidenced the highest scores and primary educated respondents the lowest (Figure 12.8).

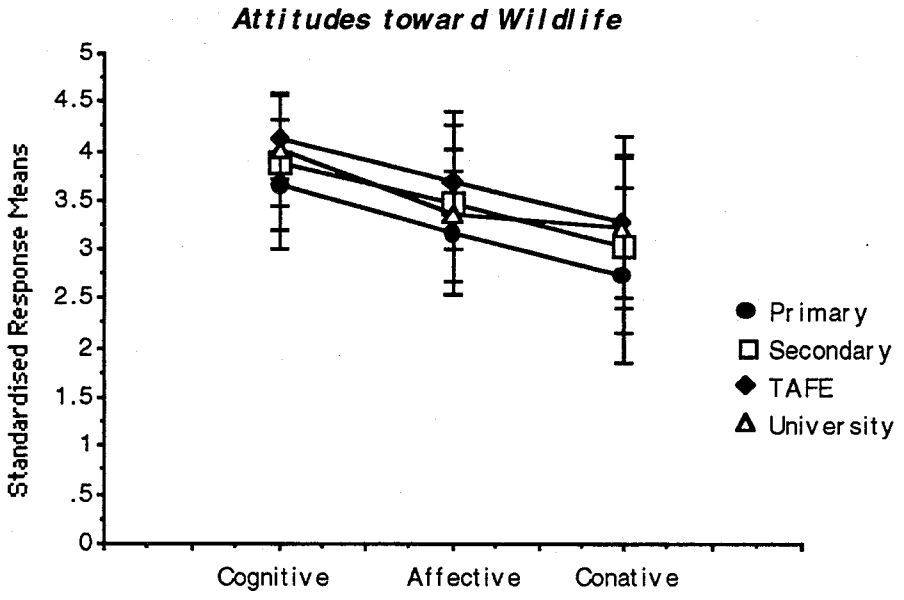

Figure 12.8 Education level differences in *Attitude toward Wildlife.*

(Standardised response means ± SD)

Overall, the results demonstrate that primary educated respondents expressed the least favourable attitudes for the composite index, and for each of the three components of *attitudes toward 'other' wildlife* . This is a similar response pattern to that for *attitudes towards cassowaries.* Once again scores peaked for the TAFE educated respondents and declined for the university educated respondents.

Income Respondents' *attitudes toward 'other' wildlife* were not significantly linked to income levels (Appendix B.2.10). For the attitude components, there was no significant difference for cognitive-based or conative-based attitudes. However, respondents with incomes below $30,000 evidenced significant more favourable affective-based attitudes than those with incomes above $50,000 [F (3,314; n = 317) = 2.51, p = 0.0301; Fisher's PLSD; *F*max = 1.99].

Years of Residence The number of years of residence was not significantly correlated with *attitudes toward 'other' wildlife* [r (n = 315) = 0.05], nor with the three attitude components. There was also no significant difference between new and long-term residents [t (314, 316) = -1.66, p = 0.0975], although new residents did evidence a lower favourability score (mean ± SD = 49.00± 7.73, n = 210) compared to long-term residents (mean ± SD = 50.52 ± 7.62, n = 105). Again this finding is contrary to the rural social theory (McBeth & Foster, 1994).

Group Membership Group membership did not differentiate between the composite *attitudes toward 'other' wildlife* score [t (314, n = 316) = 0.58, p = 0.5627], nor the attitude component scores. As well no significant difference was found between the type of group association and the composite *attitudes toward 'other' wildlife* score [F(2,318; n = 320) = 0.33, p = 0.7169; Fisher's PLSD; *F*max = 1.24], nor the attitude component scores. Conservation group members held a similar *attitudes toward 'other' wildlife* to 'other' group and non-group respondents. As with *attitudes toward cassowaries*, conservation group members expressed the lowest mean score for behavioural intention (mean ± SD = 11.81 ± 3.51, n = 32). Those belonging to other groups, which included a variety of community and business organisations, for example, service, business, tourist, farmer, church, sports etc., evidenced the highest behavioural intention score (mean ± SD = 12.58 ± 3.14, n = 62), followed closely by those respondents who did not belong to any group (mean ± SD = 12.54 ± 3.42, n = 226). For example, in response to one of the behavioural intention questions,

> *I would support the filling in of wetlands if the land could be used to produce more jobs and income,*

40.6% of conservation group members **'strongly agreed'** with this statement compared to 56.25% of the 'other' and non-group members.

Overall the results suggest that favourable *attitudes toward 'other' wildlife* are widespread across the respondent population, with only one social-situational factors appearing to have any effect on the attitude scores, education. The least and the most educated were responding similarly to wildlife as they were to cassowaries. Although the score for *attitudes toward 'other' wildlife* was favourable, it was significantly below that expressed for cassowaries. This would partially support the view that cassowaries are a more salient species in the environment compared to 'other' wildlife. This salience, however, appears to be confined to those respondents who are more directly and repeatedly experiencing cassowaries, the semiurban and rural residents. Urban residents may well be viewing cassowaries as just-another-species in the environment, revealing a degree of appreciation of wildlife that, contrary to Kellert's' findings (1983), is not narrow in its focus and directed only to one component of the animal community. The significantly stronger feelings of emotional attachment to both cassowaries and wildlife expressed by semiurban and rural respondents is an interesting finding which will be discussed later in the chapter.

12.4.3 A Profile of Respondents' Environmental Information Base[8]

12.4.3.1 General Outline

Respondents' environmental information base could only be described as modest, a pass level score (mean ± SD = 16.33 ± 4.86) (Appendix B.2.11). Sixty percent of the total number of questions which dealt with cassowary and wildlife issues were answered correctly. As a combined sample group, respondents were more factually aware of wildlife issues (65.7% correct) than they were of cassowary issues (56.8% correct).

12.4.3.2 Environmental-Contextual Dimensions

Resident Community Total environmental information score was significantly linked to resident communities (Appendix B.2.11). Urban residents were significantly less informed on environmental issues than rural and semiurban residents [F (2,317; n = 319) = 48.20, p = 0.0001; Fisher's PLSD; *F*max = 0.55]. This significant difference was also evident for each of the information categories: cassowary information score [F (2,317; n = 319) = 75.56, p = 0.0001; Fisher's PLSD; *F*max = 1.95]; and wildlife information score [F (2,317; n = 319) = 6.88, p = 0.0012; Fisher's PLSD; *F*max = 1.47]. Interestingly, rural residents consistently scored the highest (Figure 12.9).

Direct Experience Direct experience with cassowaries in the wild was significantly linked to respondents' cassowary information base [t (315, n = 319) = 7.43, p = 0.0001], with those with greater experience scoring higher (mean ± SD = 10.10± 2.89, n = 195), than those without (mean ± SD = 7.43 ± 3.44, n = 122).

12.4.3.2 Social-Situational Dimensions

Gender There were no apparent differences between male and female respondents with respect to the composite attitude score [t (318, n = 320) = 0.87, p = 0.3853], and the three attitude components on the basis of post hoc group comparisons.

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[8] With the analysis of the principle construct for this chapter completed, the focus in this section is on a variable that is very often incorporated within the attitude construct as a cognitive indicator, environmental information base. This section explores the nature and extent of respondents' knowledge on issues relevant to cassowaries and other wildlife species.

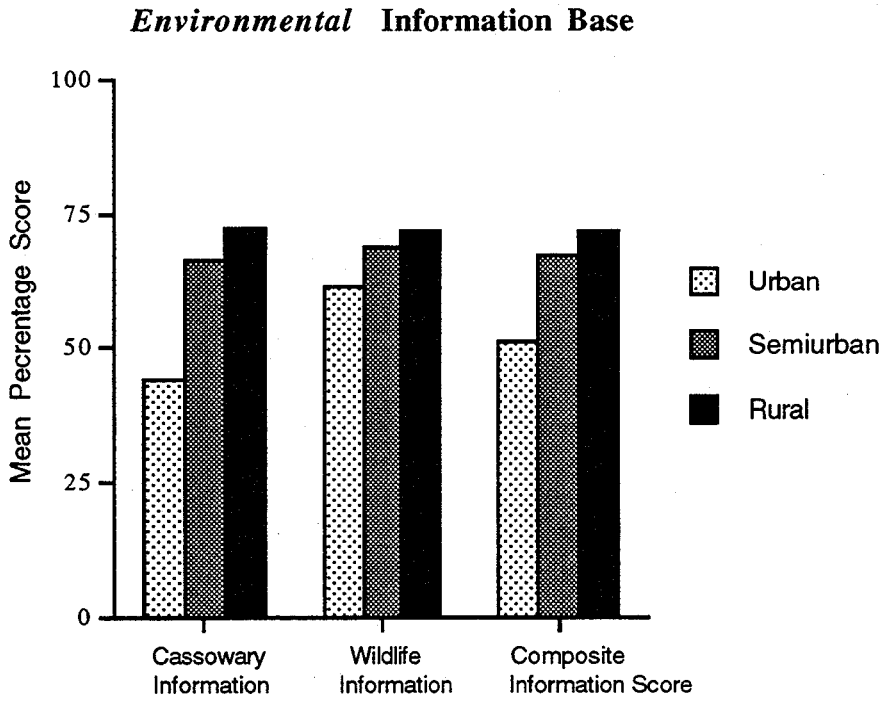

Figure 12.9 Resident community differences in environmental information base.

Age Age was positively, but not significantly, correlated with the total environmental information score [r (n = 317) = 0.19]. However, it was significantly correlated with the cassowary information score [r (n = 317) = 0.20, $p < 0.05$]. Results suggests that older respondents are more informed about cassowary issues than younger respondents.

Education Significant differences emerged between education levels and the total environmental information score [F (3,314; n = 317) = 4.25, p = 0.0058; Fisher's PLSD; *F*max = 1.23], and the sub-category, cassowary information [F (3,314; n = 317) = 6.46, p = 0.0003; Fisher's PLSD; *F*max = 1.29] (Appendix B.2.12). The results, however, were surprising and counter to expectations. Respondents with a university education were significantly less informed on the specific topic of cassowaries than the three other education groups. Primary educated respondents scored the highest for this topic. All education levels had similar wildlife information scores (Figure 12.10). This surprising finding suggests that differences in education is unlikely to be a confounding variable with respect to other group comparisons.

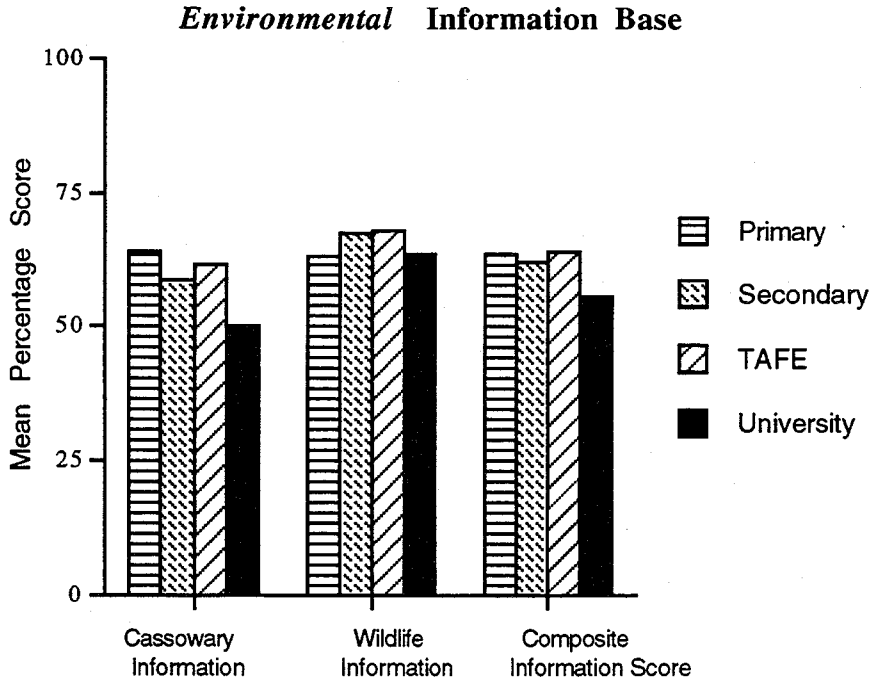

Figure 12.10 Education level differences in environmental information base.

Income Income was significantly linked to the total environmental information score [F (5,286, n = 291) = 2.61, p = 0.0248; Fisher's PLSD; *F*max = 1.67], and the sub-category, cassowary information [F (5,286, n = 291) = 2.65, p = 0.023; Fisher's PLSD; *F*max = 1.64] (Appendix B.2.13). The strongest pattern to emerge was the significantly lower scoring for those in the income bracket $40,000 and $50,000 compared to those with incomes below $30,000.

Years of Residence Number of years of residence was not significantly correlated with the total environmental information score [r (n = 316) = 0.10], nor with the two information sub-categories. However, there was a significant difference between new and long-term residents for the environmental information score [t (314, 316) = -2.43, p = 0.0156], and the cassowary information score [t (314, 316) = -2.79, p = 0.0055]. New residents were significantly less informed about cassowary-related issues than long-term residents.

Group Membership The group membership characteristic, membership versus non-membership, appeared to bear no significant relationship to the total

environmental information score [t (314, 316) = 0.87, p = 0.3851], nor for the information sub-categories. Furthermore, group membership characteristic, that is, type of membership (respondents belonging to conservation groups, those belonging to other groups, and those who do not belong to any group), did not differentiate between scores on total environmental information nor the sub-categories. Conservation group members were not significantly more informed on these issues than those who belonged to other groups. However, there was no significant difference between the information scores of conservation group members and those who did not belong to any group.

12.4.5 Correlation Analysis involving *Attitudes toward Cassowaries*

Intercorrelations between the majority of scales were high and significant as expected (Appendix B.2.14). Of the *attitudes toward cassowaries* components, the conative or intentional component evidenced the strongest correlation with the composite *attitudes toward 'other' wildlife* In contrast, the affective component of *attitudes toward cassowaries* evidenced the strongest correlation with the environmental information base.

12.5 Summary and Conclusion

In this first glimpse of the human-natural environment interface, the literature and the analyses presented in this chapter highlight the complexity and variability of *individual* representations and understandings of the natural environment. What is obvious is that individuals relate to the environment around them in different ways, with differing intensity. They experience different connections and are influenced by different needs and wants, as well as physical and social factors.

12.5.1 An *Individual's* Representation and Understanding of Natural Environmental Domains

Respondents on the whole expressed favourable attitudes toward natural environmental domains, cassowaries and 'other' wildlife (Figure 12.3 and 12.7). Nevertheless, the results suggest differences in level of that favourability across this North Queensland population sample. Cassowaries received a significantly higher positive evaluation compared to 'other' wildlife. This lends support to the need to address environmental

issues along the specific-general and local-global continuum if explanations of the human-natural environment interaction are to have broader applications (Stern et al., 1992), and if 'fields of significance' which the individual values are to be identified (Dower, 1994). According to Dower, the challenge is to render the 'whole' environment into a field of significance, although he does acknowledge that changes in behaviour that are needed to sustain the overall environment will derive from changes in local perceptions and priorities. Of the attitude components investigated, emotionally-based attitudes evidenced the strongest association with the composite attitude score.

The findings relating to extent and accuracy of environmental information, are open to a number of interpretations. Clearly the communitites investigated are only moderately well informed or knowledgeable about cassowaries, 'other' wildlife, and conservation. Having said this, the rural and semi-urban residents of this North Queensland population sample are more knowledgeable than the urban residents.

12.5.2 *Individual* Differences in Representation and Understanding of Natural Environmental Domains

The analyses presented in this chapter were also concerned with the situational or contextual dimensions of individual responses to the natural environment. This is consistent with the social psychological principle of 'what goes on *inside* people (the psychological processes) is primarily determined by factors that are *outside* of them' (Zimbardo & Leippe, 1991, p.36), including physical and social properties of the outside world. There were surprisingly few situational factors that differentiated among individual responses. Such a finding lends support to the reasonably widespread existence of favourable *attitudes toward cassowaries* and 'other' *wildlife* .

The absence of substantive relationships between demographic variables and attitude variables appears to be not uncommon in current environmental research (see for example, Jones & Dunlap, 1992), which highlights two concerns for the researcher. The first is that environmental issues have now become so widely acknowledged that a broad section of the community is significantly and psychologically affected by them, at least according to these self-reported measures. This breadth of appeal can be very important, leading to fundamental shifts in how the environment is perceived, represented, and understood and accordingly how environmental problems are defined and dealt with (Buttel, 1992). On the other hand, breadth of appeal can lead to a kind of 'taken for granted' salience, if not superficiality, trivialisation (Buttel, 1992), or even apathy, brought about by the belief that 'someone else' is taking care of the problems.

The second concern stresses the difficulties and hence challenges now facing social research in its endeavour to adequately assess the psychological domain of the environmental crisis (Reser et al., 1996). These results put into the spotlight the issue of the appropriateness and utility of conventional scales to adequately measure socio-psychological variables. This is particularly important if the research aim is the identification of problem areas such as conflicts and differences that occur within the human system rather than simply assessing the homogeneity of that system. The more that people are similar to each other on a conventional attitudinal issue, the less useful it is to measure this attitudinal position in research exploring *individual differences* in environmentally responsible behaviour, and the causes of these differences. The measure becomes much less sensitive because it no longer differentiates among individuals across a reasonable spectrum.

Environmental-Contextual Differences An aspect of this respondent sample that was particularly relevant to this research, and one that broadly defined resident communities, was the physical environment, the landscape in which the respondents resided. The rural (Granadilla) and semiurban (Mission Beach) residents interviewed had the closest connection to the natural environment and cassowaries (Section 11.3.2). On the other hand, the urban residents (Townsville) interviewed were far removed from this type of interaction. Nevertheless, both the rural and semiurban residents were directly competing with cassowaries and other wildlife in their demands on the landscape.

The rural landscape has been considerably modified as a result of several activities ranging from extensive clearing for agriculture to clearing for residential orchards. Likewise the semiurban landscape has been extensively modified in the process of accommodating the demands of continuously expanding residential and tourist developments. Urban residents were not involved in this type of direct impact on cassowaries. Furthermore, the rural lifestyle required a direct and continuous use of natural resources for agricultural activity that provided either a primary or secondary source of income, and extended across an area of from ten to 600 acres per resident. Each individual landowner, therefore, had the potential to extensively modify cassowary habitat. In contrast, individual semiurban residents did not own large acreages (less than ten acres per resident), nor did they earn an income from their land. They collectively rather than individually had the potential to extensively modify cassowary habitat.

A continuous debate in environmental research is the existence and nature of rural/urban differences concerning various environmental issues. Much of the debate has been

centred on the assumption that rural conflict over natural resource use and management is the basis for a distinct difference between rural and urban communities in attitudes toward environmental issues (Kellert, 1996). This assumption is based on the notion that rural residents who generally have larger landholdings have more to lose should restrictions be placed on their use of that land due to the protection of a particular species. The consequences of this would be reflected in a low or negative evaluation of that species. On this basis the findings of resident communities' *attitudes toward cassowaries* were unexpected. The high positive evaluation of cassowaries by the rural community, the similarity of this evaluation to that of semiurban residents, and, most importantly, the significantly higher evaluation compared to urban residents was contrary to these assumptions and to the reported findings of previous research. Such findings consistently confirmed a rural/urban distinction in environmental attitudes, but consistently in the opposite direction.

To explain the significantly higher positive evaluation of cassowaries demonstrated by the rural and semiurban residents in this North Queensland population sample it is necessary to reconsider those factors that were common to both rural and semiurban residents and yet were significantly different to urban residents. This first required a closer look at the attitude components. Semiurban and rural respondents expressed a significantly higher cognitive connection and stronger feelings of emotional attachment to cassowaries (Figure 12.4). Of these components, emotional feelings had the strongest correlation with the composite attitude score (Appendix B.2.4). Underlying factors that were linked to place of residence, factors common to both semiurban and rural residents and that were significantly associated with emotional connections to cassowaries, were direct and repeated experience with this species. This finding is consistent with the theoretical assumption and empirical evidence that both repeated exposure and direct experience with the attitude object result in heightened positive evaluations (see for example, Eagly & Chaiken, 1993; Olson & Zanna, 1993). Attitudes based on direct and repeated experience are also presumed to have the underlying property of increased strength that improves attitude-behaviour consistency (Eagly & Chaiken, 1993; Fazio et al., 1982). In addition, according to the biophilia notion, direct and repeated experience is linked to familiarity and "we learn to love what has become familiar" (Orr, 1993, p.422). In the human-animal interaction research conducted by Katcher and Wilkins (1993) they found that when children were given the opportunity to interact with animals as well as watching them there were more positive changes in their general behaviour and these changes were more persistent.

Two other factors that could partially explain the semiurban and rural residents' higher positive evaluations of cassowaries are *salience* and *information* about the species. The

findings suggest that cassowaries are a particularly *salient* species to semiurban and rural residents, whereas to urban residents they rank on the same level as 'other' wildlife. The increased salience of an attitude target (cassowaries) in contrast to a competing target ('other' wildlife) is known to enhance positive evaluation of that target as well as attitude-behaviour consistency (Pratkanis & Greenwald, 1990). Salience is also considered to be proportional to body size, the association with danger, and rarity of the organism (Soulé, 1993), all attributes of cassowaries. The symbolic value of cassowaries as a integral feature of the Wet Tropics and Mission Beach would suggest that the strong and positive emotional loading also relates to 'place meaning' and 'place identity' (Altman & Low, 1992; Chawla, 1994). Information about the target has also been considered in previous research to influence attitudes toward that target though the findings have been highly varied. In this research a strong correlation did exist between respondents' cassowary information base and *attitudes toward cassowaries*, in particular the emotional component. The *environmental* information scores paralleled the cassowary attitudinal results in that the rural and semiurban residents received the highest scores. These results support the argument that providing information about the species enhances the positive evaluation of that species. However, this result did not follow through for wildlife. Despite the significantly higher rural and semiurban residents' wildlife information scores, the wildlife attitudinal results were similar across the resident communities. A stronger information base, though necessary, has in this instance not been sufficient to enhance the positive evaluation of wildlife.

Social-Situational Profile Again, a number of unexpected findings emerged from this analysis of the social-situational profile of individual responses. The overall lack of association between the demographic variables, gender and age, and the attitudinal responses, and the *environmental* information scores, partially supports the notion that there is an expanding environmental consciousness within the communities surveyed (Jones & Dunlap, 1992). Nevertheless, the lack of association between gender and these individual responses was inconsistent with many previous studies (e.g., Kellert, 1996; Stern & Deitz, 1994; Steel, 1996). The emergence of distinct gender variations in many of the studies conducted by Kellert that specifically targeted wildlife was obviously at variance with this particular North Queensland respondent sample. The finding from this research, however, was consistent with some of the most recent research in this region of Australia (e.g., Bragg, 1995).

The social-situational dimensions for which significant associations existed were level of education and household income. Although there were no particular surprises in the income findings, education level findings were unexpected. Contrary to previous studies, lower attitudinal scores were not confined to the least educated respondents. The highest educated respondents, the majority of whom were urban residents, held equally low

scores. Another interesting result was that the attitudinal scores were not differentiated according to conservation group membership. This would suggest that although positive environmental attitudes are widespread across this North Queensland respondent sample, there exists a possible reluctance by these respondents to proclaim such an environmental stance by joining a conservation organisation. A possible explanation for this is the negative opinion many respondents have of these organisations, which were clearly identified in responses to an open-ended question. As well, a considerable number of respondents pointed out that they did not want to be associated with or identified as a "greenie".

12.5.3 Implications for Environmental Management and Endangered Species Recovery

Both the literature review and the analysis of the data set outlined in this chapter contribute quite specific and valuable information to the management and recovery of cassowaries. Most noteworthy from the data analyses was the evidence of a reasonably strong and widespread positive evaluation of the environment, in particular cassowaries, within this community sample of North Queensland. This has clear policy implications since decision makers have to rely on a base of public support to formulate and implement environmental regulatory policy (Howell & Laska, 1992). The findings indicate that management agencies have a widespread public support which, if understood and utilised properly, will assist in the development and implementation of policies aimed at cassowary recovery within these areas. In order to understand this support base, there are many specific issues arising out of the preceding analyses that require careful consideration by management agencies.

Among the many issues relevant to preserving biodiversity, the public's emotional-laden attitudes toward the natural environment play a role in motivating support for reducing the destruction of nature and the extinction of species (Ulrich, 1993). In the words of Stephen Jay Gould: "We cannot win this battle to save species and environments without forging an emotional bond between ourselves and nature as well - for we will not fight to save what we do not love" (in Orr, 1993, p.425). The results of this study lend support to this notion that emotional connection to the natural environment is associated with environmental behaviour. In addition, emotional connection to the natural environment is associated with direct and repeated experience with the natural environment. Managers must consider two aspects of these results. Firstly, the results highlight the importance of encouraging an emotionally-based mode of understanding the natural environment in all environmental information dissemination and education programs. To educate or foster

positive emotion-laden attitudes toward natural environments may appear a comparatively easy task. It is, however, not straightforward. Rather, this mode of understanding has an important caveat, to be most effective it must be experiential. In addition, this experiential understanding must be direct, *in* nature itself, as opposed to indirect or abstract, that is being confined to the classroom, information centres, television screens or glossy magazines. The other important aspect of the experience is that it must also be repeated. Just the single or even occasional encounter *with* and *in* the natural environment is not sufficient. Instead it must be continuous, enhancing familiarity with the natural environment or objects of the natural environment. Research has also indicated that presenting only positive images of the natural environment is not all that needs to be done. In addition, portraying in a vivid but accurate manner the consequences of destroying the environment produces strong emotion-laden public attitudes against such destructive activities (Ulrich, 1993).

Secondly, the results suggest that for an endangered species such as cassowaries, emotionally-based attitudes are necessary since they are important determinants of behavioural intention and behaviours, yet they alone are not sufficient. Kellert (1983) provides an example of this 'necessary but not sufficient' notion in his research on emotionally-based attitudes toward wildlife. He highlights the importance of an emotionally-based appreciation for animals in the process of raising concerns for wildlife and endangered species. However, he points out that the public "must move beyond feelings of compassion and kindness for selected animals to a conviction that the health and well-being of wildlife and natural habitats are ultimately linked to human well-being and survival" (p.228). This egocentric perspective is believed to be important in motivating individual action toward protecting the environment and will be addressed in Chapter 14. Soulé (1993) agrees with this need to move beyond the emotional if species and environments are to be preserved. What these results tell us is essentially how far the public has yet to be moved before they move beyond feelings of compassion and into the realm of action.

In addition to promoting a strong positive emotional connection to the natural environment, managers must also be aware of potential difficulties for wildlife and natural habitats of seemingly highly appreciative or emotionally-based attitudes that are exclusively directed toward specific species (Kellert, 1996). Kellert cites controversies surrounding aesthetically appealing animals such as baby seals and muted swans that have diverted public attention away from the needs of other species that might not evoke the intensity of affection and emotion. In this lies the real challenge for managers since "in light of research suggesting a robust genetic role of biophobia, even well-conceived education programs may achieve only limited success in fostering public appreciation of

certain risk-relevant properties and living things in the rain forest because of the difficulty in overcoming a biologically prepared disposition to respond negatively" (Ulrich, 1993, p.119). In this context a manager must therefore be aware of the problems associated with a species-specific focus, taking particular care of the way they use and promote single species for management purposes. Another consequence of strong emotionally-based attitudes for management is the frequent inability of the public to move beyond very specific and localised emotional connections when difficult rational-based decisions have to be made regarding the species or environment as a whole. This type of problem is often associated with decisions to cull wildlife when populations have increased beyond the carrying capacity of the environment, to destroy wildlife when they have been injured in some way, to stop hand feeding of wildlife when they are encountered, to design management or research strategies that are selective in the species or populations that are targeted.

Another result that is important to the recovery of cassowaries is the assessment of the conative or intentional component of attitudes. This attitudinal component evidenced the lowest score. A closer inspection of these responses reveals that 38% of respondents were not willing to support restrictions on land use activity due to cassowaries, with 18.8% in the neutral position, and 43.2% supportive. This lack of support increased to 46% in the rural community, with 20% of rural respondents evidencing a neutral position. Support for such action dropped to 36% in this community. The decrease in support is not unexpected, since this is the community most likely to be negatively impacted by such action. Furthermore, 'cognitions' or 'beliefs' here are enmeshed in larger belief systems relating to property rights and reactance and these belief and value-embued issues have their own strong emotional base and concomitants. For both the survival and recovery of cassowaries this identifies a particular problem area which has to be addressed by environmental managers. Majority support for such actions is still not present in the general and rural community of this North Queensland population sample. However, with carefully thought out programs there is the potential to shift the opinions of at least 20% of respondents from a neutral to a supportive position. In addition, such programs if carefully targeted would sway some of the non-supporters.

Chapter 13

Underlying Belief Systems and Value Orientations:
Shared Representations, *Collective* Understandings

13.1 Introduction

The previous chapter looked closely at attitude, a concept used to examine *individual* representations and understandings of the natural environment. In this chapter the focus and purpose extends beyond an *individual* level of understanding of discrete entities of the natural environment to *shared* representations and *collective* understandings of abstract concepts. Underlying belief systems and value orientations are concepts chosen to provide this broader level of analysis.

An investigation of underlying belief systems and value orientations attempts to differentiate *shared* or *collective* thought from *individual* thought, while at the same time providing a "bridge" between the individual and social reality. In particular, it seeks to enhance our understanding of individual psychological functioning, such as that examined in the previous chapter, by placing the individual within his/her collective or social environment, and examining the link between *individual* responses and broader belief systems and value orientations. This makes this study of *shared* belief systems and value orientations social psychological rather than sociological.

Like attitudes, underlying belief systems and value orientations are not the only concepts available to frame this *shared* or *community* perspective of the human component of the ecosystem. They are, however, concepts around which substantial theoretical and analytical development has occurred (see for example, Kluckhohn & Strodtbeck, 1961). Furthermore, they have been applied widely in social science and, in environmental research, conventional scales exist to measure these concepts.

While there is clearly an extensive psychological literature on beliefs and values, using essentially intrapsychic and individual models (e.g., Rokeach, 1960, 1973), much of the current research literature is actually undertaken by social scientists (e.g., sociologists, human geographers and political scientists) who more routinely use supraindividual levels of analysis. It is therefore this literature source that has been mostly addressed in this study.

13.1.1 Chapter Outline

This chapter begins by addressing the importance of underlying belief systems and value orientations in the context of social psychological research and the pragmatic needs of environmental management. The construction, application and assessment of two widely

used belief system and value orientation scales, the Dominant Social Paradigm and New Environmental Paradigm, is the focus of the next section of this chapter. While these scales have been used to measure attitudes, values and beliefs, the view taken here is that these measures are best understood as tapping into a more collective level of analysis and reflecting cultural perspectives and ideologies, albeit measured in terms of individual responses. These measures also give us a more general feel for where community residents are coming from in terms of their specific value and belief stances towards local environmental issues and the endangered status of the cassowary. The chapter concludes with the presentation and discussion of the analysis of the two underlying belief system and value orientation measures, the Dominant Social Paradigm (DSP) and New Environmental Paradigm (NEP).

13.2 The Importance of Underlying Belief Systems and Value Orientations

13.2.1 With Respect to Social Psychological Research and Theory

Important features that distinguish underlying belief systems and value orientations (in the way they have been used and operationalised) from such related concepts as attitudes and concerns, and that are particularly relevant to this research, include the following theoretical and methodological considerations: they guide the formation, evaluation and understanding of individual attitudes, concerns, and behaviour (Schwartz, 1994; Stern et al., 1995); they measure *shared* representations and *collective* understandings (Augoustinos & Walker, 1995); and they transcend specific situations (Schwartz, 1994).

13.2.1.1 Evaluating and Understanding Individual Experiences, Attitudes, Concerns, and Behaviour

A key theoretical and methodological consideration adopted in this research on "understanding" *humans* and *human systems* includes examining the psychological, social and physical characteristics of the human system. The analysis of person-environment relations therefore must deal not just with assessing individual experiences, attitudes, concerns and behaviours but with evaluating and understanding these psychological constructs in the context of psychological processes and within the holistic framework which includes psychological, environmental-contextual and social-situational domains. Underlying belief systems and value orientations, as *shared* representations and

collective understandings, help provide a social psychological explanation of the variations in individual experiences, attitudes, concerns and behaviours of the survey population.

The social psychological view is that many of our attitudes, concerns and actions are guided by a system of beliefs and values which are more permanently embedded in our lives than attitudes (Ittelson et al., 1974; Stern et al., 1995). Ittelson and colleagues (1974) argue that in reality most of our attitudes, concerns, actions are manifested within some kind of belief system, value-orientated context which is conceptualised as sets of control systems, differentiating between what is desirable and nondesirable, what is right and what is wrong. Others claim that attitudes are components of larger structures such as ideologies (McGuire, 1985), with ideology being defined as clusters of attitudes and beliefs organised around a dominant societal theme (see Eagly & Chaiken, 1993). Eagly and Chaiken (1993) identify a number of research areas which have raised the question of the link between attitudes and broader ideologies, for example, attitudes toward capital punishment, abortion, AIDS and race. Gooch (1995) refers to underlying belief systems and value orientations as "primitive" beliefs which he argues leads to derived beliefs, general attitudes, and behaviour. Stern et al. (1995) attempt to define a place for belief systems and value orientations within an attitude-behaviour framework. They differentiate between 'belief systems' or general beliefs, and beliefs about discrete entities, such as a particular environmental problem. In their model specific attitudes and beliefs are linked to broader belief systems or world views.

Reference has continuously been made throughout the social science literature to the linkage between commitment to underlying belief systems and value orientations and behaving in ways that are detrimental to the environment with the resultant increase in world wide ecological deterioration. The notion of such a linkage has been based on the argument that "at the root of the ecological crisis are the basic values which have built our society" (Swan, 1971, in Dunlap & Van Liere, 1984, p.1013), which include such values as individualism, materialism, limited government and progress. According to these authors these values are important because they provide guidance for both individual and societal behaviour. Dunlap and Van Liere (1984) identify two core theoretical themes behind this argument, the first is consistent with sociological theories which highlights maladaption of societal value systems if societal conditions change such as the move from the abundance era to the limits era. A linkage here is also made between core cultural values as determinants of individuals' values. The second relates to the call for paradigmatic change based on the notion that commitment to belief and value systems embedded in concepts such as the dominant social paradigm "results in support for practices and policies that lead to environmental degradation and to opposition to policies

needed to create a more ecologically sustainable society" (p.1014). It would follow that if the notion of a paradigmatic change was accepted, endorsement of the New Environmental Paradigm (NEP) should be associated with pro-environmental behaviour. Dunlap and Van Liere (1978) found that support for the NEP was positively related to a pro-environmental behaviour scale. However, Scott and Willits (1994) found that while endorsement of the NEP was somewhat predictive of engaging in environmentally action, the linkages were not strong, r did not exceed 0.21.

13.2.1.2 ***Shared* Representations, *Collective* Understandings**

A key tenet of the social psychological approach is the notion that underlying belief systems and value orientations reflect *shared* representations, *collective* understandings of the outside world. This view is based on the assumption that by virtue of an individuals' participation in the social environment the meaning of this outside world is rendered *public* and *shared* (Bruner, 1990). Psychologists (e.g., Augoustinos & Walker, 1994; Bruner, 1990) and anthropologists (e.g., Kluckhohn & Strodtbeck, 1961; Milton, 1996), argue that the individual cannot be viewed as independent of social and cultural surroundings, but rather as immersed in them and therefore develops fundamental views of these surroundings. In the context of the present research, underlying belief systems and value orientations are viewed as reflecting these *public* and *shared* meanings which are social in origin, are socially communicated, are basically about society, and hence are independent from individuals who expound them (Augoustinos & Walker, 1995). Such *shared* representations and *collective* understandings provide additional insights into the complex world of humans.

This 'universality' of belief systems and value orientations has several applications in social research. For example, against a background of common meanings and structure, *universal* belief systems and value orientations enables issues to be addressed from a comparative perspective (Schwartz, 1992, 1994). Relations of belief systems and value orientations to individual experience, attitudes, concerns and behaviour can be examined across societies and communities, which will "discriminate universal processes of mutual influence from processes tied to specific social and cultural circumstances" (Schwartz, 1994, p.43). Despite what appears to be a consensual framework inherent in this concept of *shared* representations and *collective* understandings, such consensus does not mean uniformity - diversity is not precluded. As Augoustinos and Walker (1995) point out:

> ... while at the collective level social representations function as shared objectified structures, at the individual level there is considerable variety as to how the elements of the representation are framed and articulated. (p.159)

13.2.1.3 Transcends Specific Situations

Another noted feature of underlying belief systems and value orientations is that they provide a *collective* view of abstract notions, ideas and images as opposed to an *individual* view of discrete entities. In other words these constructs 'transcend specific situations' (Schwartz, 1994), providing instead a more general, social and cultural perspective of complex cognitive structures. Unlike attitudes, which in this study relate to discrete entities, belief systems and value orientations refer to abstract notions such as individualism, collectivism, materialism.

13.2.2 In the Pragmatic Context of Environmental Management

Environmental managers are under considerable pressure to provide for the needs, demands, and expectations of an ever-increasing human population and an ever-decreasing wildlife population. The question of how to interpret and evaluate these divergent requirements and viewpoints of the human population is a major challenge for decision makers who are responsible for managing natural resources. Uncertainty among decision makers and conflict among users highlight the complex and sensitive nature of the environmental management process. So what can an investigation of underlying belief systems and value orientations offer?

To "manage" such complex environmental transactions, there is the need to document and measure people's beliefs and values in order to understand and thereby communicate with the public. Such communication is needed to resolve conflict and encourage participation and involvement; after all, beliefs and values help mediate and moderate attitudes and behaviours. In addition, it is possible to intervene and change attitudes and behaviours through long-term interventions such as education and legislation.

13.2.2.1 Management of Environmental Conflict

Environmental conflict is most often linked to the diversity of needs of various users of natural resources (Kellert, 1996). Such conflict arises between humans and the

environment (in particular humans and wildlife), and humans and humans (in particular the established or traditional users and vicarious users). The resolution of environmental conflict ultimately involves environmental management agencies. In an attempt to understand the causes of intense environmental conflicts, many researchers have utilised the concepts of underlying belief systems and value orientations as a means of conceptualising and investigating such issues. For example, Edgell and Nowell (1989) believed it was essential to gain a sound understanding of underlying belief systems in order to investigate conflicts which arose out of the interaction between commercial and recreational fishing interests and marine mammal protection. They argued that such an understanding was critical to effective environmental management, but that wildlife and environmental decision makers traditionally do not access and utilise such information in their decision-making process.

13.2.2.2 Improving and Protecting Environmental Quality

Environmental managers have to pay attention to the trade-offs involved in improving and protecting environmental quality. A variety of costs, including higher prices or taxes and restrictions on individual or corporate behaviours, are part of most environmental policies. Researchers therefore need to examine public support for the policies in view of these costs. The trade-offs between environmental quality and other widely valued ends such as low taxes, economic growth, free enterprise, and private property rights suggest the importance of examining differential commitments to these underlying belief systems and value orientations as determinants of support for various environmental management strategies. The importance of underlying belief systems and value orientations has been suggested in a number of studies; for example, Dunlap and Van Liere (1978, 1984) found support for private property rights, laissez-faire government, and economic growth to be strongly correlated with environmental concern, and to explain a considerable amount of variation contrasted with demographic variables reviewed in later studies.

13.3 Measuring Underlying Belief System and Value Orientations

13.3.1 Construct Considerations

Beliefs and values have not been considered by many as radically different constructs, either in lay language or in social science discourse. They do have particular emphases

and nuances in use, however, which are interesting and noteworthy. Beliefs tend to suggest more embracing cognitive systems and schemas; they relate to how we understand and represent the world and those things in it as well as how it all works. Values, on the other hand, have more to do with how individuals and cultures think the world should be, and relate more to value "judgements" rather than taxonomic or causal clarifications and orderings. The classic treatment of values is of course that of Rokeach (1973) who defines a value as referring to a single belief of a very specific kind.

In the environmental domain clear distinctions between beliefs and values are even more difficult to find, as the discourse itself is highly politicised and judgemental. All beliefs are premised on value stance and vice-versa. It is in this context, that one takes a more pragmatic tact and focuses on content rather than the central nature of the construct. This is a problem if the objective is to clearly examine individual psychological processes. It is less critical if the purpose is to describe and characterise the views of the community or nation with respect to environmental issues and concerns. In this latter context, there is much to be said for using existing paradigms and measures and comparing and contrasting a target community's "understandings" and "representations". Nevertheless, there is a real need to more squarely address issues of best practice and good science with respect to how we can pragmatically and usefully specify and measure "beliefs" and "values" relating to the natural environment, and impacts which are of particular interest.

13.3.2 Two Existing Scales: The Dominant Social Paradigm (DSP) and the New Environmental Paradigm (NEP)

Over the past three decades many social scientists have explored the waxing and presumed waning of the environmental movement in North America, while at the same time environmental protection legislation and societal concerns about deteriorating environmental quality necessitated sociometric and psychometric responses to a need for environmental evaluation tools. In the process of social theory construction, two scales, the Dominant Social Paradigm Scale (DSP) and the New Environmental Paradigm Scale (NEP), emerged as the most widely used measures of environmental belief systems, value orientations, attitudes and concerns. These scales were constructed by sociologists with a keen interest in monitoring and documenting societal change and shifting political ideologies and allegiances (Dunlap & Van Liere, 1978; Catton & Dunlap, 1980). However, despite the importance and considerable popularity given to the theoretical conceptualisation of the DSP and NEP, they were not examined empirically prior to 1978 and 1984. Individual dimensions of the DSP such as economic growth, laissez-faire

government and political ideology had been explored in the context of specific measures but a composite scale remained wanting.

13.3.3 Construction of Scales

13.3.3.1 Dominant Social Paradigm

Dunlap and Van Liere first constructed the DSP scale in 1978, developing 37 Likert-type items to measure the dimensions of the DSP most relevant to environmental issues. This involved an extensive review of the literature and was premised on the argument that "traditional American values and beliefs contribute to environmental problems and/or hamper efforts to ameliorate them" (Dunlap & Van Liere, 1984, p. 1015). The items were based on eight factors which were considered to represent critical DSP dimensions: (1) commitment to limited government; (2) support for free enterprise; (3) devotion to private property rights; (4) emphasis upon individualism; (5) fear of planning and support for the status quo; (6) faith in the efficacy of science and technology; (7) support for economic growth; and (8) faith in material abundance.

Data which measured the 37 DSP items, together with additional measures of environmental concern, environmental protection and the new environmental paradigm were collected from 806 adult residents of the state of Washington, U.S.A. A mail survey technique was used. Although the main purpose of the study was to examine empirically the linkage between commitment to the DSP and concern for protecting environmental quality, equally important was exploring the existence of the eight hypothesised dimensions and their item construction. This was tested using factor analysis. The results generally supported the existence of the hypothesised dimensions and the hypothesised content of the eight factors. From the original 37 items, 29 were identified as measuring the DSP dimensions.

13.3.3.2 New Environmental Paradigm

The New Environmental Paradigm Scale (NEP) was intended as a more historically congruent replacement of the DSP. It was developed in the context of evident and dramatic shifts in the environmental consciousness of North Americans (Dunlap & Van Liere, 1978; Catton & Dunlap, 1980). The authors of the NEP scale describe it as a measure of non-traditional environmental beliefs, values, and attitudes, reflecting a new world view, or societal paradigm shift. The objective of the scale was to create an

instrument which could explore "the degree to which the general public has come to accept the ideas embodied in the [new environmental paradigm]"...and... "to develop an instrument to measure the New Environmental Paradigm" (Dunlap & Van Liere, 1978, pp. 10-11). This scale was designed as a measure of the endorsement of a number of new environmental concepts and ways of thinking, such as, "balance of nature", "limits to growth", and "spaceship earth".

The same survey as that outlined for the DSP was used in constructing an instrument to measure the New Environmental Paradigm (Dunlap & Van Liere, 1978). In addition to the general public sample, 407 members of environmental organisations in Washington were surveyed at the same time. These two samples were important for comparative purposes, providing information on the validity of the proposed NEP measuring instrument. The 12 items designed to measure the NEP were developed after carefully considering the NEP-oriented literature and advice given by environmental scientists and ecologists. They were considered to be the most representative set of items which would address all important aspects of the NEP such as limits to growth, balance of nature, and anti-anthropocentrism. Internal consistency of the 12-item scale was confirmed, and it was not found useful or necessary to delete any items. Factor analysis suggested a unidimensional scale.

13.3.4 Application of the Scales

13.3.4.1 Dominant Social Paradigm

The assumed relationship between the dominant social paradigm and environmental degradation was, according to Dunlap and Van Liere (1984), based on "sociological theories which emphasised that a societal value system may become maladaptive if the conditions facing the society change " (p.1014). Hence commitment to the dominant social paradigm would identify a population willing to support behaviour which would lead to environmental degradation. Although a number of studies had examined the relationship between environmental concern and individual dimensions of the dominant social paradigm, the results of the Dunlap and Van Liere study (1984) were the first to confirm the hypothesis that commitment to the dominant social paradigm does in fact correlate with lower levels of environmental concern.

13.3.4.2 New Environmental Paradigm

Over the past twenty years the NEP has emerged as the most frequently used measure of multiple concepts, for example, environmental beliefs, environmental values, environmental attitudes, environmental concern (see for example, Arcury & Christianson, 1990; Dunlap & Van Liere, 1978; Edgell & Nowell, 1989; Noe & Snow, 1990; Stern & Dietz, 1994). From early on it was subjected to a number of critical reviews and psychometric explorations and assessments (see for example, Albrect et al., 1982; Geller & Lasley, 1985). These analyses of how the scale worked as a measure were different in kind from those typically done in the context of personality tests, in that the domain of interest was, at least initially, political value orientation and ideological commitment, with a more sociological focus.

The need for a general environmental attitude and concern measure has been cited as the reason for the construction and use of the New Environmental Paradigm scale. This has been linked to the inconsistency of results, a problem often cited in the literature on environmental attitudes (Arcury et al., 1986; Dunlap & Van Liere, 1978, Noe & Snow 1990). Because of the complex array of measurements used in the past it has been difficult to develop consistency and continuity in measurement of the constructs of environmental concern and attitude and hence any meaningful interpretation of results has been lost. The criticism has targeted those studies which focused on narrowly defined concepts of environmental attitudes toward issues such as pollution, land use, waste, energy etc. Dunlap and Van Liere (1978) and Van Liere and Dunlap (1980) investigated whether a more general position about society and its resources existed among the American public on which the more specific environmental attitudes, concerns and actions were based. According to Scott and Willits (1994), the NEP items clearly seek to measure general orientations. Together they therefore were considered as one scale that surmounts the problems associated with the multiplicity of scales used to measure environmental attitudes.

13.3.5 Assessment of the Scales

13.3.5.1 Utilised as an Individual Level of Analysis

The interest of researchers in the development of such widely used scales led to a problematic working operational definition of environmental attitudes and concern. Instead of attempting to carefully specify, conceptually and operationally, *individual* elements of attitude constellations or beliefs, the strategy adopted was to use these

existing endorsements of differing world views as a reasonable measure of *individual* environmental beliefs, values, attitudes and concerns. Such a strategy has proven very frustrating for social scientists and environmental managers with a practical need to be able to monitor specific attitudes and concerns and hopefully modify or change *individual* attitudes which appear to be influencing environmentally insensitive behaviour. What is required is an understanding that such encompassing belief systems and value orientations as those embedded in the DSP and NEP are measures of *shared* representations, *collective* understandings to which *individual* elements of attitude constellations may possibly be anchored.

13.3.5.2 Multiple Meanings

In reviewing the studies which use the DSP and NEP, a multiplicity of concepts and constructs measured by these scales is evident. Even within the studies themselves, there is a wide range of terms assigned to the constructs, once again highlighting the fluid and often inconsistent use of terms. Variation in the terminology used to describe the concept underlying the DSP and the NEP, can also be confusing.

Therefore, the increasing use of the scales as a robust measure of psychological attitudinal and value stance, and environmental concern argues for a critical revisiting of the nature and purpose of the measure, and its reasonableness with respect to the constructs it is being used to measure. Its current and widespread use has seen it drift rather far away from its initial intellectual moorings, with it now being used to measure 'environmental' awareness, attitudes, values, beliefs, and concern in a rather indiscriminate way. This raises multiple issues of construct validity, meaningfulness, appropriateness and comparability with respect to a putative measure of all things environmental.

13.3.5.3 Multiple Perspectives

The NEP and DSP studies reviewed bring together analyses of a wide range of environmental issues, conducted from a diversity of personal and theoretical perspectives. Sociologists, social and environmental psychologists, political scientists, environmental managers, environmental educators, have all used these scales. This diversity of use has highlighted the interest in environmental issues across the spectrum of academic disciplines and the desperate need the researchers of environmental issues have for appropriate analytical tools. However, it has also uncovered the predominance of the

atheoretical use of these concepts, and the lack of a clear conceptual definition of what the scales are actually measuring.

Social Theory Construction As outlined previously, Dunlap and Van Liere (1978, 1984) developed the DSP and NEP scales in an endeavour to explore human-environment relationships in terms of human behaviour and social organisation, and to provide empirical evidence of the proposed paradigmatic change, a change in underlying societal world views. It is argued that this change is occurring along a continuum from an anthropocentric world view which sociologists claim to have been in place for the past several centuries (Arcury et al., 1984; Dunlap & Van Liere, 1978), to an ecocentric world view considered the product of the advent of postindustrial society (Gooch, 1995; Steel et al., 1990), of increased ecological degradation (Dunlap & Van Liere, 1978, 1984; Gooch, 1995; Steel et al., 1989), ecological awareness (Arcury et al., 1986), and the environmental movement (Albrect et al., 1982; Fien, 1993; Geller & Lasley, 1985).

Social Psychological Theory Construction There are those researchers who have conceptualised the DSP and NEP as *primitive beliefs* (Gooch, 1995; Stern et al., 1995). Beliefs such as "humans are above and apart from nature", "nature should be utilised by humans", "progress and growth are natural, inevitable and good", which are described by the DSP and NEP, are considered part of an environmental belief system, the *primary belief system* which leads to derived beliefs and general environmental attitudes (Gooch, 1995). Although the emphasis in this model is on a belief hierarchy and attitude formation, Gooch does go on to stress the importance of these primitive beliefs to behaviour, "Primitive beliefs are "thought to be some of the most deeply internalised and most determinative of behaviours" (Gray, 1985, in Gooch, 1995, p.516).

Stern et al. (1995) were specifically interested in placing the NEP in the context of social-psychological theory of attitude formation and attitude-behaviour relationship. They achieved this by examining the NEP (which they used as a general belief measure) in relation to a number of variables in a theoretical model of environmental concern. The model seeks to define a place for these beliefs within an attitude-behaviour framework. Their proposal is that the NEP, as a measure of general (primitive) beliefs, should fit into a causal model between values and more specific beliefs, such as beliefs about specific environmental problems. This model is considered important because, unlike other social psychological attitude-behaviour models, it links specific environmental attitudes and beliefs to broader world views. The results suggested that the NEP could be seen as "a link between social structural forces and socialisation processes that influence them and specific attitudes and behaviour that flow from them" (Stern et al., 1995, p.739).

Environmental Education For Arcury and colleagues (1986, 1990a, 1990b), environmental education was the underlying theme of their work, hence the issue of ecological awareness was central to their framework of social environmentalism theory. They argue that the interrelationship between the NEP, education and environmental knowledge has important implications for environmental educators. The results of their research indicated that not only was general educational attainment important but there was the need to incorporate the teaching of *values* as well as *facts* in environmental curricula.

Central to Gigliotti's (1992) research was the notion that personal lifestyle changes were critical to the process of solving environmental problems. In testing the hypothesis that people who see benefits of economic growth or have faith in technological solutions were less willing to make personal sacrifices to help solve environmental problems, he was able to confirm this linkage[1]. These results suggested that, in terms of environmental education, messages appear to have succeeded in increasing the general environmental concern levels but have failed to convince the public about their own role in the environmental deterioration process. The implications of this for environmental education was that the link between today's lifestyles and environmental problems must be stressed in future environmental messages (Gigliotti, 1992).

Wildlife and Environmental Management The National Parks social scientists, Noe and Snow (1990) and Noe and Hammitt (1992), addressed the issues and concepts arising from the NEP from an environmental management perspective. Evaluation and monitoring of environmental concern (NEP) and the relationship of environmental attitudes (NEP) and management options were the focus of their research. On the other hand, the geographers, Edgell and Nowell (1989), argue that wildlife and environmental conflicts are part of a broader conflict between an established constellation of social beliefs and values emphasising technological, growth-oriented utilisation of the environment (the dominant social paradigm, DSP) and a more recent constellation of values and beliefs emphasising an ecologically benign new world (the new environmental paradigm, NEP). They acknowledge that wildlife decision makers traditionally have not accessed and utilised information about values and attitudes in their decision-making process, an understanding of which is critical to effective wildlife management. Nevertheless, they consider the NEP to be a scale which provides a means by which wildlife managers can reliably assess "difficult-to-quantify value considerations" and "a useful referential framework of environmental beliefs in which to understand attitudes and

[1] This research used the modified version of the NEP and DSP developed by Kuhn & Jackson (1989) which focused on items relating to the negative consequences of growth and technology.

to attempt resolution of wildlife management conflicts" (p.285). Finally, they do point out that, although they are reluctant to suggest any replacement of these standardised scales, a refined version which would include aspects of both the NEP and the DSP, and that included specific wildlife concerns might allow them to more clearly define the belief domains of wildlife exploitive groups, the groups with the lowest NEP mean score.

A Political Science Perspective Steel et al. (1990) examined the relationship between citizens' attitudes concerning potential hazards of environmental pollution (risk perception), political and social value orientations and policy-relevant knowledge. The NEP scale was used to measure social value orientations. Political and environmental value orientation indicators were found to be the most important determinants of risk perception concerning Great Lakes pollution.

13.3.6 Utilising the DSP and NEP Scales in the Present Study

As has been outlined, a multiplicity of concepts and constructs has been assigned to the DSP and NEP, making any meaningful investigation of what these scales are actually measuring difficult. The diversity of personal and theoretical perspectives which underlie their use also highlights the problem of defining, in any consistent manner, what the scales are actually measuring. An additional issue to be considered is the primary objective behind the use of these scales. Are they used to measure individual, community, and/or population differences, people's relation to, accounts and understandings of the environment and/or psychological processes, beliefs, values, attitudes or concern?

In this research the DSP and NEP scales provide an analytical point of departure and convenient means for exploring existing and widely used measures for characterising North Queensland environmental beliefs and values. Essentially the scales are used as an evaluation tool for measuring *community* or *shared* representations and *collective* understandings of the outside world, conceptualised as underlying belief systems and value orientations. In addition to operationalising these *shared* representations and *collective* understandings, the DSP and NEP scales provide a means for investigating *individual* psychological processes in the context of *shared* meaning systems and within a social psychological theoretical framework.

13.4 Results and Discussion

What follows is a presentation of results of the analyses of the target communities' *shared* representations, *collective* understandings, conceptualised as underlying belief systems and value orientations. The results principally derive from the use of the Dominant Social Paradigm (DSP) and New Environmental Paradigm (NEP) scales and are presented so as to address the following general questions.

1	What is the nature and magnitude of the commitment to the underlying belief systems and value orientations as measured by the DSP and NEP scales in this North Queensland respondent sample?
2	How do these beliefs and values differ from those reported elsewhere in Australia and the world?
3	Which underlying belief and value orientation dimensions appear to be most determining with respect to actual commitment (endorsement), experienced conflict and environmental behaviour, and how do they impact on local community attitudes, concern and behaviour?
4	How useful are the DSP and NEP scales in understanding attitudes, *environmental* concern and environmentally responsible behaviour, both in the context of environmental management, and with respect to theory development?

This results section presents analyses of each scale separately and in combination. While a number of tables and figures are presented within the text, the majority are found in Appendix B.3.

13.4.1 Dominant Social Paradigm (DSP)

13.4.1.1 Psychometric Evaluation of the DSP

The analysis confirmed the reliability and construct validity of the DSP scale (see Appendices B.3.1., B.3.2, B.3.3, and B.3.4). It provided support for its mutidimensionality, key dimensions and the use of all items in further analyses. Given these results, the study included all items in the analyses keeping the original DSP scale items together. The dimensional content was altered slightly such that the analyses proceeded according to the modified item content of the dimensions *laissez-faire government* and *economic growth*. Findings did not support any modification of item content in the DSP scale in future studies. These results can be considered a cross

validation of the structure of the DSP, since the data are based on a unique set of three north Queensland populations.

13.4.1.2 Respondent Profile of the DSP

***Total DSP Score*[2].** A medium endorsement level of the DSP was evident from the results (mean ± SD = 85.24 ± 13.23, n = 319) (Appendix B.3.5). In addition to the mean response, the actual spread of the population across the DSP endorsement-non endorsement continuum was examined. Operationalising high endorsement of the total DSP score as a mean score of at least 116, (i.e., mean rating for a 4 or 5 point agreement scale for the 29 questions), only 0.6% of respondents were found to be within the high endorsement range (Figure 13.1).

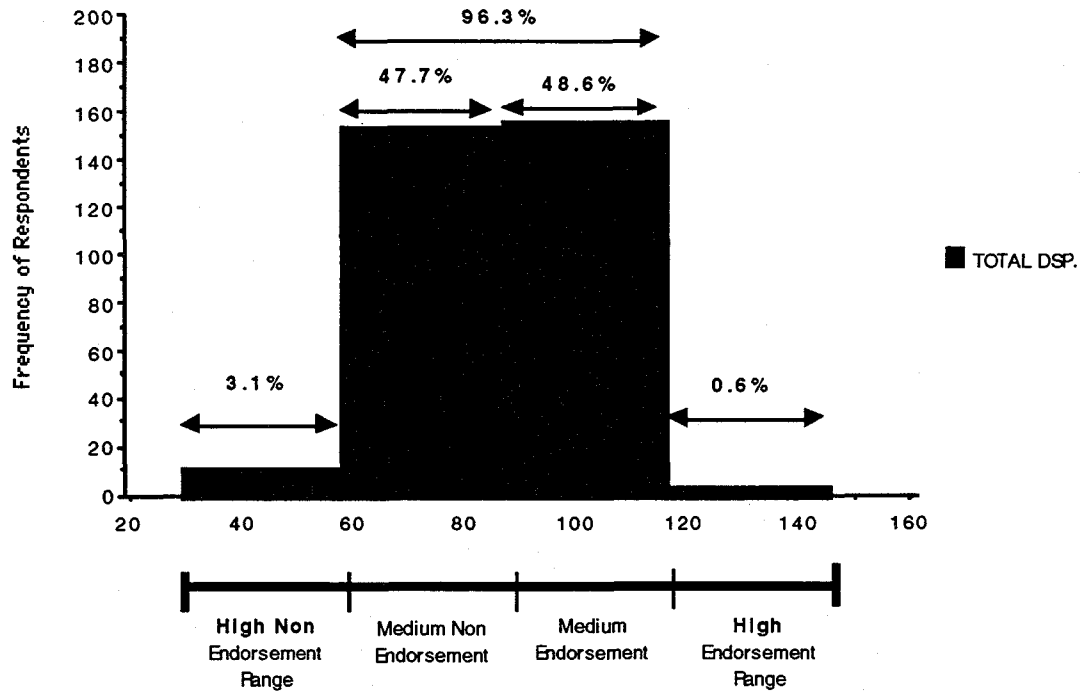

Figure 13.1 Location of study population on DSP endorsement -non endorsement continuum.

[2] DSP items were coded such that a high score indicated endorsement of the paradigm.

According to Milbrath (1985), this 0.6% would represent the 'rearguard' - strong defenders of the DSP, people who resist social change. In this study they were a forty-nine year old, high school educated male semiurban resident and a sixty-two year old, high school educated female semiurban resident. On the other side of the continuum, 3.1% of respondents evidenced a high non endorsement DSP rating. The majority of respondents (96.3%) were located within the central position, committed to some DSP items and not to others. Within this central position, respondents were almost equally positioned on the endorsement (48.6%) and non endorsement side (47.7%). In total, 49.2% of the respondents evidenced some level of commitment to the DSP.

With only very few individuals (3.7%) using the farthest ends of the scale - strongly agree or strongly disagree; the communities surveyed did not appear to be polarised on this set of beliefs, but instead were holding moderate beliefs and ideologies as defined by the total DSP. Notwithstanding this suggestion of "middle ground" shared community understandings as opposed to "radically different" or "extreme" individual or specific group understandings, it must not be discounted that 49.2% of respondents were endorsing the DSP, albeit at a moderate level.

DSP Dimensions. Results indicated that actual dimension means for *laissez-faire government*, *economic growth* and *future prosperity* existed within the medium endorsement range, with the *science and technology* response mean on the broader (see Appendix B.3.5.). Scores for the remaining dimensions were all within the non endorsement range (see Figure 13.2. and Appendix B.3.6 for standardised dimension mean results). These results suggest that the underlying set of cognitive beliefs most representative of a commitment to the DSP for this study population were the dimensions *laissez-faire government, economic growth,* and *future prosperity* . The importance of these dimensions was supported by the factor analysis results (Section 13.4.1.1).

Correlations between the dimensions were as follows: *laissez-faire government* was correlated with *private property rights* [r (n=320) = 0.32, $p < 0.001$], and *economic growth* [r (n=320) = 0.30, $p < 0.01$] (see Appendix B.3.7). Respondents who expressed their support for limited government were also likely to support issues relating to the rights of property owners and growth in the economy. This reflects attitudes grounded in the values of the liberal theory of property dominant since the eighteenth century (Dodds, 1994). According to Dodds, this theory proposes that "the libertarian version of a liberal justification of property rights leaves little room for regulation of property rights" (p.58), which is consistent with the support given in this study for limiting government regulations and restrictions.

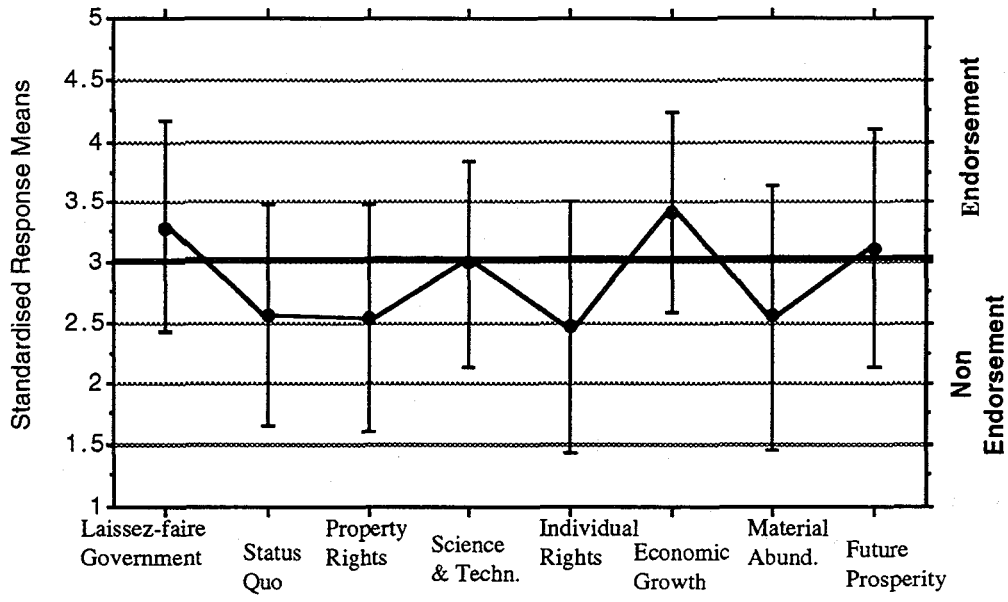

Figure 13.2 Endorsement levels of DSP dimension. (one standard deviation error bars)

The significant correlations between *economic growth* , *science and technology* [r(n=320) = 0.39, $p < 0.001$], and *future prosperity* [r (n=320) = 0.33, $p < 0.001$] confirm O'Riordan's (1976a) notion of "optimism". In developing this notion he argues that the application of scientific knowledge to improving the condition of humans is readily accepted as a fundamental objective of contemporary Western society. Closely linked to this optimistic perspective is the concept of growth, economic growth, "The degree of faith in science and technology is seen to expose different ideologies about the merits and purposes of growth. Technological optimists regard growth and technological improvement as interdependent, while those who doubt the efficacy of modern technology believe that a complete change in its form and function is possible outside sustained economic growth" (O'Riordan, 1976, p.23). The whole concept of growth is endemic in most societies. *Economic growth* is closely linked to collective wealth which is generally regarded as essential for improved social and personal well-being. This is equated with an increased standard of living and hence quality of life. A *prosperous future* includes high quality of life/standard of living.

It is interesting to note that although *individual rights* and *material abundance* were significant correlated [r (n=320) = 0.19, $p < 0.05$], neither dimension was significantly

correlated with any of the remaining dimensions. In the case of *individual rights* the results would suggest that these rights have been identified as separate to private property rights and government regulation even though the individual rights items address the issue of both 'rights' and 'regulations'.

13.4.1.3 Differences in the DSP: The Environmental-Contextual Dimension

Resident Communities The highest level of endorsement of the DSP was evident in the semiurban resident community (mean ± SD = 88.96 ± 13.52). This was followed by rural (mean ± SD = 85.71 ± 15.26.), and urban resident community (mean ± SD = 82.26 ± 11.76) (see Appendix B.3.5.). Respondents from urban and semiurban communities differed significantly in total DSP scores, with semiurban residents having a significantly higher score than their urban counterparts [F(2,316; n=318) = 7.134, p = 0.0009; Fisher's PLSD; *F*max = 1.68] (Appendix B.3.5.). This difference is illustrated in Figure 13.3, with 59.4% of semiurban residents defending the DSP and as such endorsing a more conservative, anthropocentric viewpoint, as compared with 36.9% of urban residents. In addition, semiurban residents exhibited the greatest spread across the range and hence the greatest diversity in responses, with 1.4% of that population located within the high endorsement range, in contrast to zero percent for the other two resident communities. Such a result is at odds with the notion of a rural/urban - conservative/liberal dichotomy in traditional DSP beliefs, and is rather more consistent with the argument that the general 'greening' of the population "has diluted, if not extinguished, many differences between rural and urban environmental values" (Fortmann & Kusel, 1990, p.227). A closer look at the underlying set of beliefs was required.

A similar pattern of responses to the majority of DSP dimensions was evident across the resident communities, illustrated in Figure 13.4. However, significant differences in two DSP dimensions were identified (Appendix B.3.5.). For *laissez-faire government*, rural and semiurban residents scored significantly higher than urban residents [F(2,316; n=318) = 9.34, p = 0.0001; Fisher's PLSD; *F*max = 1.94]. Rural residents on the other hand scored significantly higher than urban residents on the *private property rights* dimension [F (2,316; n=318) = 4.62, p = 0.0106; Fisher's PLSD; *F*max = 1.46].

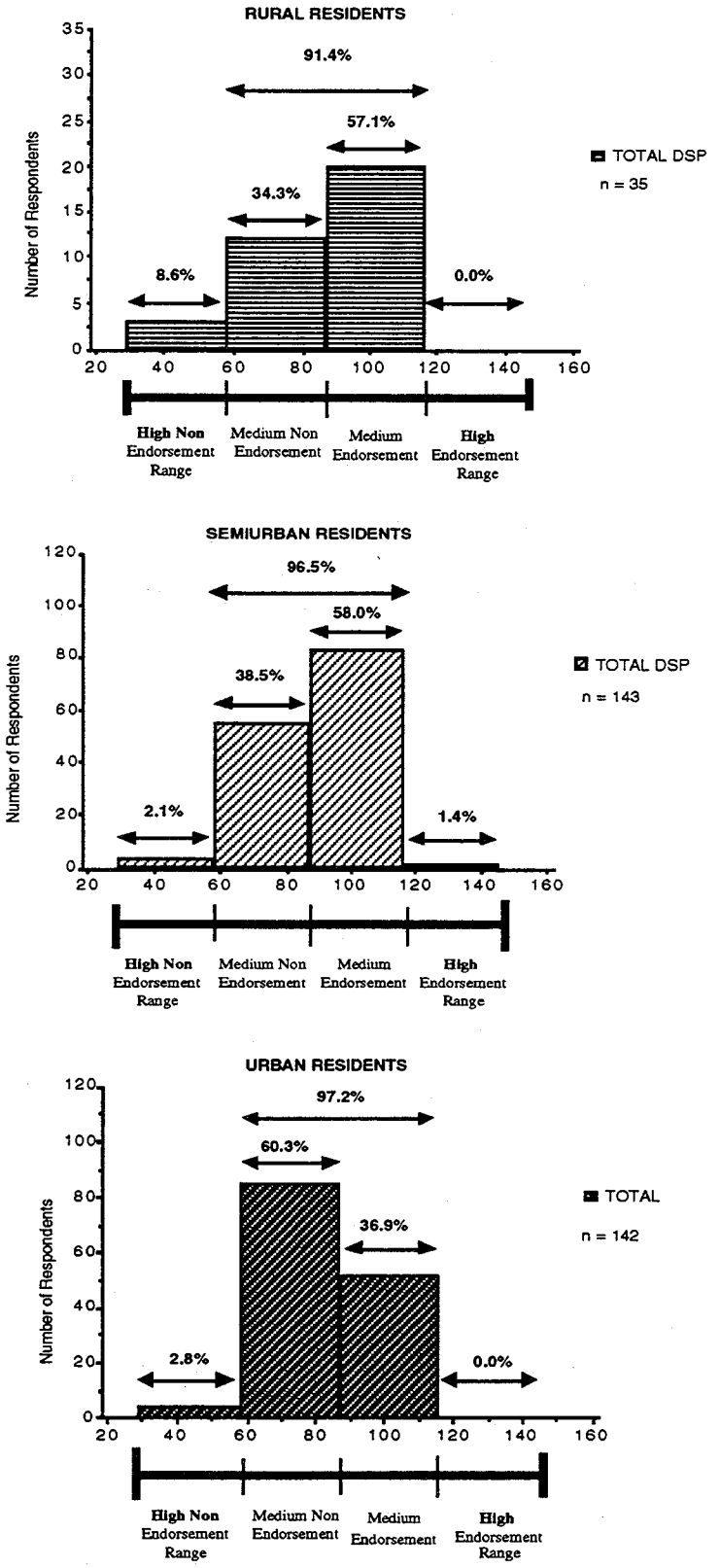

Figure 13.3 Location of resident communities on the DSP endorsement - non endorsement continuum.

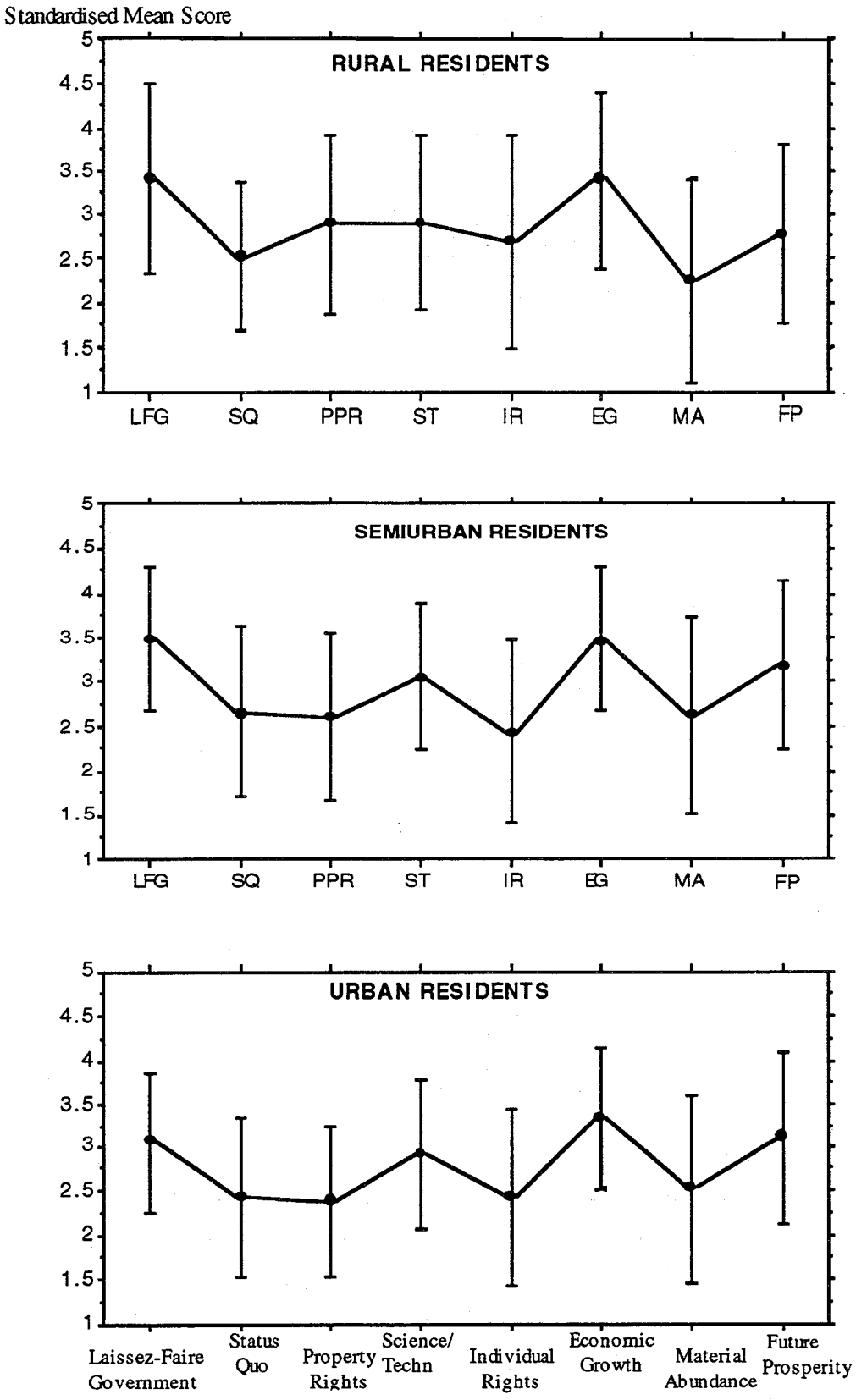

Figure 13.4 Resident community DSP dimension profile.

Overall, the study population and its resident communities can be characterised as populations which do not fully endorse the constellation of social beliefs and values which emphasise an anthropocentric world view, in which humans seem to be separate from nature. In fact, the central position adopted by the majority of the population suggests a populace which is holding beliefs and values with the least intensity. This would suggest that the rural North Queensland community surveyed does not conform to the stereotype of the ultra conservative, anti-environment right, nor is it really a split community in terms of its endorsement of 'ideological' beliefs and values relating to the environment.

13.4.1.4 Differences in the DSP: Social-Situational Dimension

Gender There were no apparent differences between male and female respondents with respect to the DSP [t (318, n = 320) = 1.51, p = 0.1327]. However, females were scoring significantly lower than males in their support for the *status quo* [t (318, n = 320) = 2.35, p = 0.0193]; faith in *science and technology* [t (318, n = 320) = 2.3, p = 0.0219]; and faith in *future prosperity* [t (318, n = 320) = 2.77, p = 0.0529]. In contrast, females were scoring significantly higher than males in their support for *economic growth* [t (318, n = 320) = -1.94, p = 0.0529].

Although, overall, there was not a significant gender difference in the commitment to the DSP, the results do suggest that females are less willing to place their faith in *science and technology* and *future prosperity* . This result is consistent with the 'Institutional Trust Hypothesis' proposed by Davidson and Freudenburg (1996) which holds that "(a) women tend to be more distrustful than men of institutions, particularly those involving science, technology, and government; and that (b) levels of confidence and trust are negatively related to concern" (p.319). In their extensive review of 17 studies which addressed gender relationships to faith in *science and technology*, the evidence was clear that women were less confident in science and technology than men. On the other hand, the results of this study do not support the first of three proposals of the 'Economic Salience Hypothesis' which states that males are more likely than females to be concerned about economic issues (Davidson & Freudenburg, 1996). In this study females were found to be more supportive of *economic growth* than males.

Age There was no significant correlation between age and total DSP score, and on closer examination of the DSP dimensions the only statistically significant result was a negative correlation between age and *individual rights* [r (n = 315) = -0.21, $p < 0.05$]. Older respondents were more likely to reject the notion of individualism than

younger respondents. Lack of association between the DSP and age is interesting considering it has been defined consistently as the most reliable predictor of environmental concern (Jones & Dunlap, 1992; Van Liere & Dunlap, 1980). The 'aging' hypothesis, which is based on the view that youth have a lower commitment to dominant social values and institutions (Blaikie, 1992; Van Liere & Dunlap, 1980), was not supported with these results.

An additional hypothesis that was considered was Mannheim's cohort hypothesis or theory of generations (Van Liere & Dunlap, 1980). A cohort analysis would provide a general overview of the distribution of responses according to designated cohorts and may identify a DSP response pattern associated with these cohorts which could be explained as influences of important historic events on birth cohorts (Blaikie, 1992). Responses to the DSP were calculated according to ten year cohorts (Table 13.1).

Table 13.1 Ten year cohort analysis of DSP scores.

10 year cohort	n	mean	± SD
16-24	49	84.67	± 10.94
25-34	67	82.87	± 13.93
35-44	67	82.37	± 13.74
45-54	65	85.32	± 12.42
55-64	27	93.00	± 14.33
> 65	38	88.34	± 12.66

A five year cohort analysis confirmed this response pattern. The position of the youngest age cohort again is at odds with the aging hypothesis. The age group most likely to reject the dominant social values were between 25 and 40 years of age (five year cohort analysis). The age group most likely to defend the dominant social values were between 55 and 64 years of age, in particular this age group was most supportive of *laissez-faire government, economic growth* and *science and technology.*

Education Significant differences were evident between education level, the total DSP and six DSP dimensions (see Appendix B.3.8.), suggesting that education is the most important social-situational indicator of this set of beliefs and value orientations

so far. Higher educated respondents (TAFE and university) were significantly more likely to score lower than primary and secondary educated respondents on,

Total DSP: [F(3,313; n = 316) = 13.24, p = 0.0001; Fisher's PLSD; *F*max = 1.25]
a) limiting government: [F(3,313; n = 316) = 5.48, p = 0.0011; Fisher's PLSD; *F*max = 1.30]
b) rights of private landowners: [F(3,313; n = 316) = 9.18, p = 0.0001; Fisher's PLSD; *F*max = 0.70]

In addition, secondary, TAFE and university respondents were significantly more likely to score lower than primary educated respondents on,

c) status quo: [F(3,313; n = 316) = 7.68, p = 0.0001; Fisher's PLSD; *F*max = 1.44]
d) science and technology [F(3,313; n = 316) = 6.80, p = 0.0002; Fisher's PLSD; *F*max = 1.13]

University educated respondents were significantly more likely to score lower than all other education levels on,

e) economic growth [F(3,313; n = 316) = 7.14, p = 0.0001; Fisher's PLSD; *F*max = 2.02]
f) future prosperity [F(3,313; n = 316) = 3.21, p = 0.0234; Fisher's PLSD; *F*max = 1.29]

These results confirm the reliability of education as an indicator of these underlying belief systems and dominant social values.

Income Respondents' income level was not significantly different according to total DSP score and the six DSP dimensions (see Appendix B.3.9). However, endorsing a strong valuation on *material wealth* was, as expected, significantly linked to people with higher incomes [F(5,285; n = 290) = 3.40, p = 0.005; Fisher's PLSD; *F*max = 1.68]. What is clear is that very different kinds of people occupy similar income brackets in contemporary Australia. Perhaps this is particularly noticeable in North Queensland, where a high income primary producer with no education may have a comparable income to a "white-collar"" executive.

Years of Residence New residents[3] evidenced a lower total DSP score (mean ± SD = 84.24 ± 13.17, n = 209) compared to long-term residents (mean ± SD =

[3] New residents were defined as those who had lived in the study area for less than ten years, and long-term residents as those who had lived in the study area for ten years or more. This categorisation was based on Fortmann and Kusel's (1990) proposal that the ten year cut off point assumes that "people who have remained in an area for ten years may have been socialized to local attitudes" (p.217).

87.06 ± 13.30, n = 106). Nevertheless, no differences were found for these DSP scores according to residential status [t (313, n = 315) = -1.79, p = 0.0752].

Group Membership A significant association was found between group membership/non membership and the total DSP score. Respondents who belonged to a group tended to have significantly lower total DSP scores than non-members [t (313, n = 315) = -2.02, p = 0.0439]. Nevertheless, this differentiation was not evident in DSP dimensions. No significant difference was found between type of group association, that is, conservation, other and no group association, and total DSP score. This was also the result for the DSP dimensions. This absence of differences reflects reported findings in the previous chapter and would suggest that the identity of these social groups is not related or contingent upon an anthropocentric world view.

Overall these results suggest that the moderately held set of beliefs as defined by the DSP is fairly widespread across the respondent population. The moderate level at which this *collective* understanding of concepts embedded in the DSP is held, is the majority position. Only three situational dimensions, resident status, education, and group membership, differentiated between respondents according to the total DSP score. This suggests that endorsement of an anthropocentric world view is most likely to be found amongst semiurban residents with an education no higher than secondary level and who are independent of any group affiliation. In addition, the findings suggest that the set of beliefs or value orientations for which there is endorsement, *laissez-faire government, economic growth* and *future prosperity,* play an important role in the way the majority of this sample population think, live, and behave. Endorsement of the latter two belief sets in particular is fairly widespread. On the other hand, responses to the *laissez-faire government* dimension were more complex, with residence status, education and income evidencing significant differences in responses. The value orientation for which there is least differentiation in responses and hence overall consensus, is *material abundance* , with the majority of the respondent population, excluding those with incomes above $30,000, expressing an equivalent level of non endorsement. This *shared* perspective would extend to higher income earners if non endorsement was the criteria.

13.4.2 New Environmental Paradigm (NEP)

13.4.2.1 Psychometric Evaluation of the NEP

The analysis confirmed the reliability and construct validity of the NEP scale (see Appendices B.3.10, B.3.11, and B.3.12). Although support was provided for its mutidimensionality, the structure of these dimensions and hence concept validity differed from those presented by Dunlap and Van Liere (1978). The use of all items in further analyses was also justified. Given these results, the following procedural decisions were made. The study continued to include all items in the analyses, keeping the original NEP scale items together. The dimensional content was altered such that the analyses proceeded according to the modified item content of the renamed dimensions. In subsequent analyses variables were defined in terms of 'new' factor scores based on the data from this unique Queensland population.

13.4.2.2 Respondent Profile of the NEP

Total NEP Score[4] An examination of the means suggested that the respondent population endorsed the NEP (mean ± SD = 48.66 ± 6.88, n = 320) (Appendix B.3.13). When operationalising high endorsement of the NEP as a mean score range of 48 to 60 (mean score rating of 4 or 5 for 12 items), the findings indicate that the majority of respondents (54.1%) were located within this high endorsement range (Figure 13.5). In total, 94.1% of the study population endorsed the NEP. No respondent occupied the high non-endorsement end of the continuum and only 5.3% were on the non-endorsement side of the continuum.

NEP Dimensions The three NEP dimensions were well within the endorsement range (Appendix B.3.13). The dimensions *limited resilience* and *respect with non interference* evidenced a high endorsement level and *humanity not over nature* a medium endorsement level (Figure 13.6).

[4] Of the 12 questionnaire items designed to measure the New Environmental Paradigm, NEP, eight were worded such that agreement reflected acceptance of the NEP, while for the remaining four disagreement reflected acceptance of the NEP. Coding for these was reversed so that commitment to the New Environmental Paradigm was evidenced by high scores.

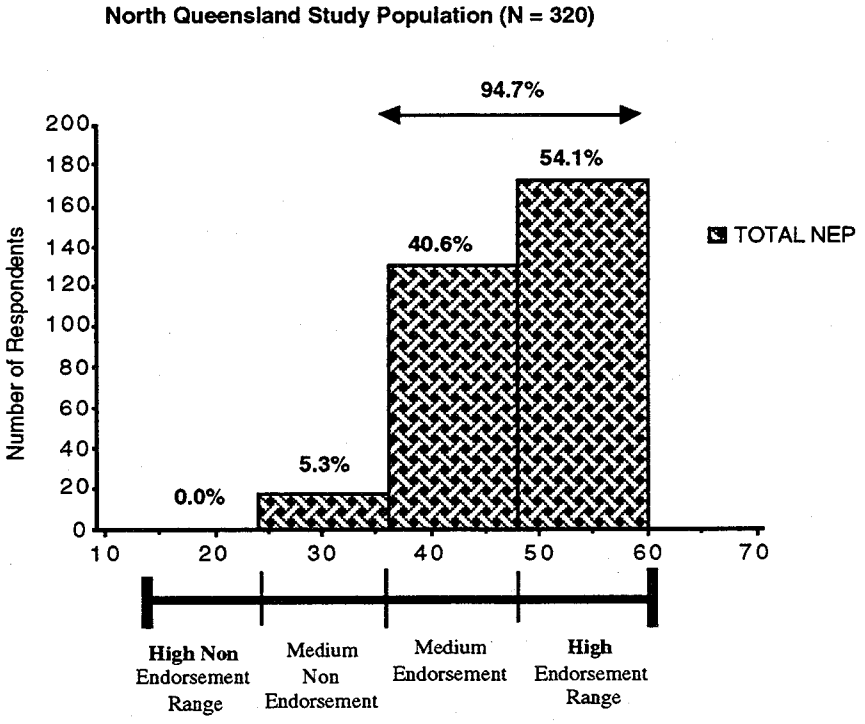

Figure 13.5 Location of study population on the NEP non endorsement - endorsement continuum.

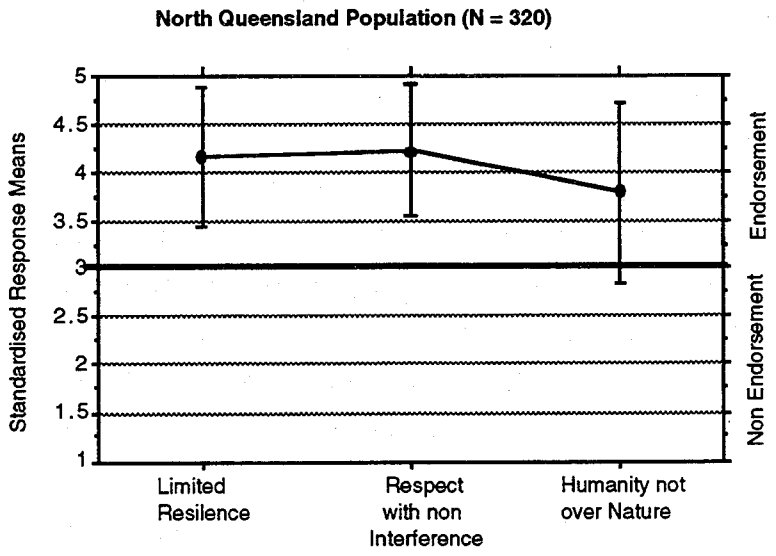

Figure 13.6 Endorsement levels of the NEP dimensions.

13.4.2.3 Differences in the NEP: The Environmental-Contextual Dimensions

Resident Communities No significant differences were found in resident communities' NEP scores (Appendix B.3.13). All groups equally endorsed the NEP, suggesting that resident community membership was not a determinant of endorsement. This contrasts with the results of Arcury and Christianson's (1990) surveys conducted in 1984 and 1988, which used a modified version of the original NEP scale. In both surveys they found urban residents had a greater tendency to endorse the NEP than rural residents.

The frequency distributions of agreement responses to individual items reveals a survey population closely aligned in their responses to the majority of items and highly skewed toward the endorsement end of the continuum (Appendix B.3.13). For all items which indicate a deep emotional concern about the fate of nature and the environment, level of agreement was high and responses similar across resident communities. However, departure from this very high agreement rating was evidenced in the rural residents' response to the statement, "Humans are severely abusing the environment". Although it attracted majority support, it was not as strong as for other issues addressed in this dimension, with 74% agreement as compared to 79% semiurban, and 91% urban agreement.

Items which addressed the more complex issues of 'industrial growth', 'steady state economy', and 'Spaceship Earth', did not receive the overwhelming support evidenced with respect to the original *balance of nature* dimension. A possible explanation is that these are arguably confusing items, hence eliciting varying interpretations. Noe and Snow (1992) support this argument, suggesting that such concepts are difficult for the public to comprehend because they are perceived as 'ethereal' and are based on more technological knowledge of ecology and economics, knowledge not common across the majority of the population. Most support was given to, "The earth is like a spaceship with only limited room and resources"; attracting 80% agreement from rural residents, 90% and 88% respectively for semiurban and urban residents. The item which received the lowest rating from rural residents was, "There is a limit to growth beyond which the industrialised society cannot expand", with 63% rural agreement, 69% semiurban, and 70% urban agreement. On the other hand, an item which portrayed rural residents as more concerned about environmental modification and less for their own rights compared to their counterparts was, "Humans have the right to modify the natural environment to suit their needs"; 23% of rural residents agreed as compared with 41% semiurban, and

37% urban agreement. This is an unexpected reversal of positions taken by these community groups.

Comparative studies While overall this study population evidenced responses similar to those reported by Scott and Willits (1994), and Dunlap and Van Liere (1978), there were some marked differences (Appendix B.3.14). The higher level of agreement for the following three items in the current research,

> *The balance of nature is very delicate and easily upset.*
> *When humans interfere with nature, it often produces disastrous consequences.*
> *To maintain a healthy economy, we will have to develop a steady state economy where industrialized growth is controlled.*

and the markedly lower level of agreement for these items,

> *Humans were created to rule over the rest of nature.*
> *Plants and animals exist to be used primarily by humans.*

compared to the earlier Dunlap and Van Liere study, suggests an increase in support for the NEP over time.

Despite the evidence of an increase in endorsement of the NEP over time, neither this study nor the Scott and Willits results indicate a dramatic shift in the paradigm over the past 18 years. However, two very different countries are being considered here, and the environmental movement has had a somewhat different time frame (Doyle & Kellow, 1995; Fein, 1993; Young, 1991). Mean responses to seven NEP items from this current study were therefore compared to those available from a study conducted in Melbourne in 1989 (Blaikie, 1992), illustrated in Appendix B.3.14. With one exception, Item No.6, the remaining six items all have higher mean scores in the North Queensland population sample than in the Melbourne sample. This overall higher endorsement level may well indicate a temporal shift toward a more sympathetic view of the environment. Environmental issues have received considerable exposure in North Queensland in the past six years, especially since the World Heritage listing of the tropical rainforests in the region (Doyle & Kellow, 1995). North Queensland is, however, a world away from Melbourne, geographically and culturally.

13.4.2.4 Differences in the NEP: The Social-Situational Dimensions[5]

Gender Female scores for the total NEP and each NEP dimension were consistently higher then scores of male respondents. Despite this, no significant relationship was found between gender and the total NEP [t (318, n = 320) = -1.78, p = 0.0763]. This result is consistent with Scott and Willits's (1994) findings. However, there was a significant difference in one NEP dimension. Female scores were significantly higher than male scores for *humanity not over nature* [t (318, n = 320) = -2.41, p = 0.0164], with females expressing less willingness to exert dominion over nature. This gender difference trend for females to hold slightly stronger general pro-environmental views than males, though of relatively small magnitude, is consistent with Blaikie's (1992) research, but inconsistent with that of Arcury and Christianson (1990), who found males to be more supportive of the NEP than females. In general, these results provide only very limited support for gender differences in the NEP. Gooch (1995), Stern (1992) and others argue that gender may be a significant variable when analysing specific environmental issues as opposed to more general environmental issues such as those measured by the NEP scale. However, results from the previous chapter would discount this view.

Age No significant relationship between age and total NEP score and NEP dimensions. This is clearly at odds with previous research such as that of Arcury (1990) and Arcury and Christianson (1990). These researchers found a substantial inverse association between age and the NEP total score and dimensions. Scott and Willits (1994) found age to be significantly and inversely related to only one of the NEP dimensions, *humanity not over nature*. Because the results from this study were so inconsistent with previous research, a ten year cohort analysis was calculated as with the DSP scale. As expected, the response pattern mirrored the inverse of the DSP responses for the first three and last two age cohorts (Table 13.2). No significant difference was found between the age groups. This response pattern differs to that of Blaike (1992), who found the endorsement level peaking in the 25 to 34 age group and declining there after.

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[5] The socio-demographic basis of the NEP, in particular gender, age, education, and income, has received considerable attention in previous research. The results from this study will be compared to these previous results.

Table 13.2 Ten year cohort analysis of NEP scores.

10 year cohort	n	mean	± SD
16-24	49	48.12	± 7.0
25-34	67	49.19	± 7.12
35-44	67	49.27	± 6.55
45-54	65	49.34	± 6.29
55-64	27	47.04	± 6.94
> 65	38	48.34	± 7.48

Education Significant differences were found between education level, total NEP score, and NEP dimensions (see Appendix B.3.15). TAFE educated respondents had significantly higher endorsement scores for the total NEP than the remaining education categories [$F(3,314; n = 317) = 6.78$, $p = 0.0002$; Fisher's PLSD; $F\text{max} = 1.13$]. For each of the NEP dimensions, university educated respondents had significantly lower scores than TAFE educated respondents. For *humanity not over nature*, primary and secondary educated respondents' scores were also significantly lower [$F(3,314; n = 317) = 6.16$, $p = 0.0004$; Fisher's PLSD; $F\text{max} = 1.53$], with primary scores being lower than all other education categories. This was consistent with the findings of Arcury (1990) and Arcury and Christianson (1990), who reported similar significant associations. However, in this study there was not a straightforward high NEP endorsement-high education level association. Rather, endorsement levels peaked with TAFE educated respondents and declined again with the university educated respondents. This response pattern is consistent with that of *attitudes toward cassowaries* results in the previous chapter.

Income Respondents' income was significantly linked to the total NEP score [$F(5,286; n = 291) = 2.859$, $p = 0.0155$; Fisher's PLSD; $F\text{max} = 1.73$] (see Appendix B.3.16). Respondents with incomes between $10,000 and $20,000 appeared to endorse a stronger ecocentric view than those with incomes above $30,000. All income levels equally endorsed *humanity not over nature.* For the remaining two dimensions, the highest income earners did not hold as strong a view as those in the $10,000 to $30,000 bracket. One could argue that economic necessity and dependency do not sit well with a strong NEP endorsement.

Years of Residence No significant relationships were found between years of residence, the total NEP score nor NEP dimensions.

Group Membership Group membership did not differentiate between the total NEP score [t(314, n = 316) = -0.413, p = 0.6799], nor the NEP dimensions. In addition, a significant difference was not found between type of group association and the total NEP score, nor the NEP dimensions. Once again conservation group members appear to have a similar ecocentric belief system and value orientation as 'other' group members and non group respondents.

13.4.3 Dominant Social Paradigm and New Environmental Paradigm Interrelationship

13.4.3.1 Psychometric Analysis of DSP and NEP Combined [6]

The analysis clearly indicated that the NEP was psychometrically distinguishable from the DSP (see Appendices B.3.17 to B.3.22),with two scales indeed measuring separate constructs. Because the oblique factor of both the DSP and NEP scales combined indicated that several factors were intercorrelated, a second order factor analysis was attempted. Results from this analysis suggest that these two scales occupy different sections of a broader, underlying, complex set of beliefs and cultural assumptions.

13.4.3.2 Relationship between the DSP and NEP

As expected, the composite DSP score was found to be significantly and negatively correlated with the composite NEP score (Table 13.3). The less committed respondents were to the anthropocentric world view, the more likely they were to hold a strong ecocentric value orientation.

When taking a closer look at the relationships between the underlying structure of the two belief systems it was found that only three DSP dimensions were correlated significantly

[6] Twenty-nine DSP items were factor analysed, together with the 12 NEP items, to (a) confirm the independence of the two scales, and (b) determine whether the NEP items could be subsumed under any of the DSP dimensions. In addition, this combined scale factor analysis was undertaken to confirm or disconfirm the original factorial nature of the separate scale analyses.

Table 13.3 Correlations between the DSP and the NEP. (N = 320)

	Limited Resilience	Respect with non interference	Humanity not over nature	TOTAL NEP
Laissez-Faire Government	- 0.11	- 0.10	- 0.06	- 0.12
Status Quo	- 0.02	- 0.03	- 0.14	- 0.08
Private Property Rights	**- 0.38 *****	**- 0.22 ***	**- 0.26 ****	**- 0.40 *****
Science & Technology	- 0.06	0.07	**- 0.21 ***	- 0.01
Individual Rights	**- 0.27****	**- 0.22 ***	0.02	**- 0.19 ***
Economic Growth	- 0.17	- 0.09	**- 0.24 ****	**- 0.24 ****
Material Abundance	**- 0.34 *****	- 0.18	- 0.11	**- 0.29 ****
Future Prosperity	- 0. 06	0.04	- 0.11	- 0.08
TOTAL DSP	**- 0. 33 *****	- 0. 17	**- 0. 29 ****	**- 0. 38 *****

Note: * = Significant at .05, ** = Significant at .01.
*** = Significant at .001 two-tailed

with the composite NEP score, *private property rights*, *material abundance*, and *economic growth*. That is, the strongest supporters of the rights of private property owners, material wealth and economic growth were least committed to an ecocentric value orientation. These three anthropocentric belief structures appear to be the most important DSP dimensions for delineating the strongest proponents of the NEP and the strongest defenders of the DSP. These results are consistent with those of Dunlap and Van Liere (1984) who also found support for private property rights, faith in material abundance, and support for economic growth to the have the strongest effects on the NEP. On the other hand, the lack of a significant association between the composite NEP score and the remaining five DSP belief structures suggests that these are the value orientations which underlie commonalities in world views.

Five of the eight DSP dimensions were significantly (negatively) correlated to one or more NEP dimensions. Those respondents less concerned with private property rights were more likely to espouse values such as the need to live in harmony with nature, to limit growth and to reduce the modification of the natural environment. This was similarly the case with *individual rights* except for the absence of a correlation with

humanity not over nature. Those whose faith in science and technology was somewhat reduced were again more likely to be concerned about humans dominating nature. Faith in the indefinite growth in the economy was only significantly linked with the notion that humans are the rulers of nature. Endorsing a strong valuation on material wealth was negatively correlated with the limited resilience of nature. The DSP dimensions *laissez-faire government, status quo* and *future prosperity* were not significantly correlated with any of the NEP dimensions. Again this lack of association suggests that these are the value orientations where respondents partake in both world views.

Overall, the results support the notion that endorsement of the DSP leads to a lower commitment level to the NEP. However, while the DSP as a whole is negatively related the NEP, some of its dimensions, particularly commitment to private property rights, material abundance, and economic growth, are more important than others in their influence on the NEP.

13.5 Summary and Conclusion

The literature review and the analyses presented in this chapter provide additional theoretical and analytical insight into the human-natural environment interface. By exploring the notions of *shared* representations and *collective* understandings which are widely used in social science discourse, underlying belief systems and value orientations have emerged as an appropriate and useful way of conceptualising this social psychological phenomenon in the context of this present study.

13.5.1 Validity of Existing Measures of Underlying Belief Systems and Value Orientations

Before proceeding into a summary discussion and drawing conclusions from the findings of the analyses of this data set, it is necessary to address the issue of validity of measures used in this study. As noted in the literature review, specifying and measuring underlying belief systems and value orientations in the social science disciplines has been inconsistent and largely a problem of developing an appropriate theoretical framework and concept validity. A pragmatic understanding of validity in psychological measurement necessitates answering the question how useful or appropriate (that is, valid) is the information provided. Alternatively, how appropriate are the measures for answering the specific

questions asked, are they really correct or valid indicators of what one is trying to study, do they really get at what needs to be assessed? (e.g., Ghiselli et al., 1981; Oskamp, 1984; Streiner & Norman, 1995).

The Dominant Social Paradigm (DSP) and the New Environmental Paradigm (NEP) are both extensively used constructs and measures that have helped to bring some consistency of use, if not clarification of conceptual definition. However, there has been no agreement as to the construct validity or structural purity of the scales, and whether both scales are needed or one subsumes the other. The results from this study clearly document the existence of a coherent set of beliefs and value orientations or *shared* understandings in the communities surveyed. Indeed the research findings of others support this finding (e.g., Dunlap & Van Liere, 1978, 1984). Overall, it is clear that the Dominant Social Paradigm and the New Environmental Paradigm are measuring two distinct domains of environmental belief systems and value orientations. Both paradigms co-exist and both are contemporary. What is not so clear, however, is that this complex of beliefs and value orientations is quite the suggested scenario of two paradigms out there in the world, one a reflection of past assumptions and understandings, the DSP, the other the presence of a new ecological awareness, the NEP.

Factor analysis (Appendix B.3.3.-B.3.4) of this North Queensland data set confirmed the factor structures of the Dominant Social Paradigm that have been reported in previous studies using this instrument (see for example, Dunlap & Van Liere, 1984). In contrast, the factor structure for the New Environmental Paradigm (see Appendix B.3.10-B.3.12) varied for two factors but remained as before for the third. Multidimensionality of these scales was confirmed. The interesting and theoretically important question is whether these two scales occupy different sections of a broader underlying complex set of beliefs and cultural assumptions relating to environmental understandings. The results of the second order factor analysis (Appendix B.3.17-B.3.22) involving these two scales confirm this assumption. Six of the Dominant Social Paradigm dimensions occupy two distinctly separate sections of this broader belief/value system. The New Environmental Paradigm dimensions, however, share some common ground with the remaining two Dominant Social Paradigm dimensions, *material abundance* and *individual rights* issues.

13.5.2 *Shared* Representations and *Collective* Understandings of Social, Cultural, and Environmental Issues

The constellation of social and cultural beliefs and value orientations which emphasises an anthropocentric belief system and value orientation was moderately held by this North

Queensland population sample (Figure 13.2). In addition, the communities surveyed did not appear to be polarised on this set of beliefs, taking instead a "middle ground" position on most issues (Figure 13.1). In fact, extreme views were minimally evident, with very few individuals using the extreme ends of the scale - strongly agree or strongly disagree. This finding suggests that the scale was identifying a set of *shared community* understandings as opposed to "radically different" *individual* understandings. In addition, the central position adopted by the majority of respondents resulted in an overall non-endorsement of this anthropocentric belief system and value orientation. This suggests that these communities hold belief systems and value orientations based on the DSP with the least intensity, possibly unwilling or unable to commit themselves to any extreme or polarised view.

To expand on this particular explanation for the "middle ground" position, the notion that this is a survey population unsure of their views on these societal issues is put forward, a notion consistent with Tesser's theory on attitude polarisation (see Eagly & Chaiken, 1993; Liberman & Chaiken, 1991). Tesser and his colleagues found that the less people knew about an issue, the less likely their views would be polarised. In addition to reflecting a lack of knowledge, inherent in this uncertainty was the need for consistency. Resolving inconsistency in attitudes was found to require considerable cognitive processes that resulted in a more extreme position. Liberman and Chaiken (1991) were able to extend this consistency principle when they found that consistency was sought not only among attitude-relevant thoughts of discrete entities, "but also among the broader cognitive network in which the attitude is embedded, including related values" (p.211). Having a moderate anthropocentric view could therefore imply a need to avoid personal conflict, such as inconsistency in personal belief systems and value orientations should they exist, making a central or moderate position most attractive. Inconsistency in belief systems and value orientations was found to exist when comparing the results of both the DSP and NEP analyses. Such a phenomenon, as will be demonstrated, is not unusual.

Respondents from all communities in this North Queensland population sample were very sympathetic toward the environment, based on the belief system and value orientation of the NEP (Figure 13.6). The general consensus and magnitude of support for this ecocentric view was considerable, with the results clustering around a positively polarised position held by the majority of respondents (Figure 13.5). Nevertheless, what must not be discounted is that 49.2% of respondents are endorsing the DSP, albeit on a moderate level. While respondents did not fully endorse the anthropocentric view, for many, such traditional beliefs and values still exist. Together these findings lead to the interesting and to some extent expected conclusion that many people partake of the beliefs of the anthropocentric view as well as an ecocentric view. According to Dunlap and Van Liere

(1984), Milbrath (1985), and O'Riordan (1976a, 1977) such a result is not surprising. In fact, they argue, it reflects the tensions which many people experience when trying to balance the need to conserve and the need to exploit. At an individual level of analysis, social psychologists such as Rokeach (1973) have shown that conflicting cognitions (beliefs/values), referred to as *dissonance*, are often held, demonstrating the complexity of the human-environment interface. Dunlap and Van Liere (1984) argue that the societal level equivalent of dissonance is *paradigmatic conflict*, the presence of competing sets of beliefs and values such as those demonstrated here in these results. Milbrath (1985) would classify this group of respondents as "environmental sympathisers", that is, they are sympathetic toward environmental values but also hold aspirations for economic growth, future prosperity, and limited government, the dominant value orientations which identify areas of intra-personal conflict and inconsistency in the majority of the survey population in this study. To those taking the environmental perspective (e.g., O'Riordan, 1976a, 1977), a society exhibiting a combination of both anthropocentric and ecocentric views reflects the reality of modern environmentalism. Despite what appears to be a distinction between these two views, O'Riordan cautions against dividing the world neatly into an ecocentric and anthropocentric camp since in real life such boundaries are blurred as is evident in these findings.

Another noteworthy finding was that three anthropocentric value orientations were negatively associated with the ecocentric view (Table 13.3), suggesting that these were more important value orientations than others in influencing this view. Respondents who strongly supported private property rights, economic growth and material abundance were less likely to be strongly committed to an ecocentric view. This finding suggests that these dominant value orientations are important sources of opposition to a pro-environmental belief system and value orientation and operate by exercising constraint on the way respondents think, live and behave toward the natural environment. The delineation of the strong proponents of the NEP from the strong defenders of the DSP according to these value orientations in this North Queensland population sample is consistent with the findings of Dunlap and Van Liere (1984) and partially consistent with Milbrath's (1985) research. Figure 12.7 places these findings within Milbrath's (1985) spatial representations of postures toward the environment. Overall, these findings emphasise the importance of situating the environmental belief systems and value orientations, such as those embedded in the NEP, within a social, economic and cultural context - larger "value-systems" (Rokeach, 1973; Schwartz, 1992, 1994). Failure to do so would limit the broader explanatory potential of the scales.

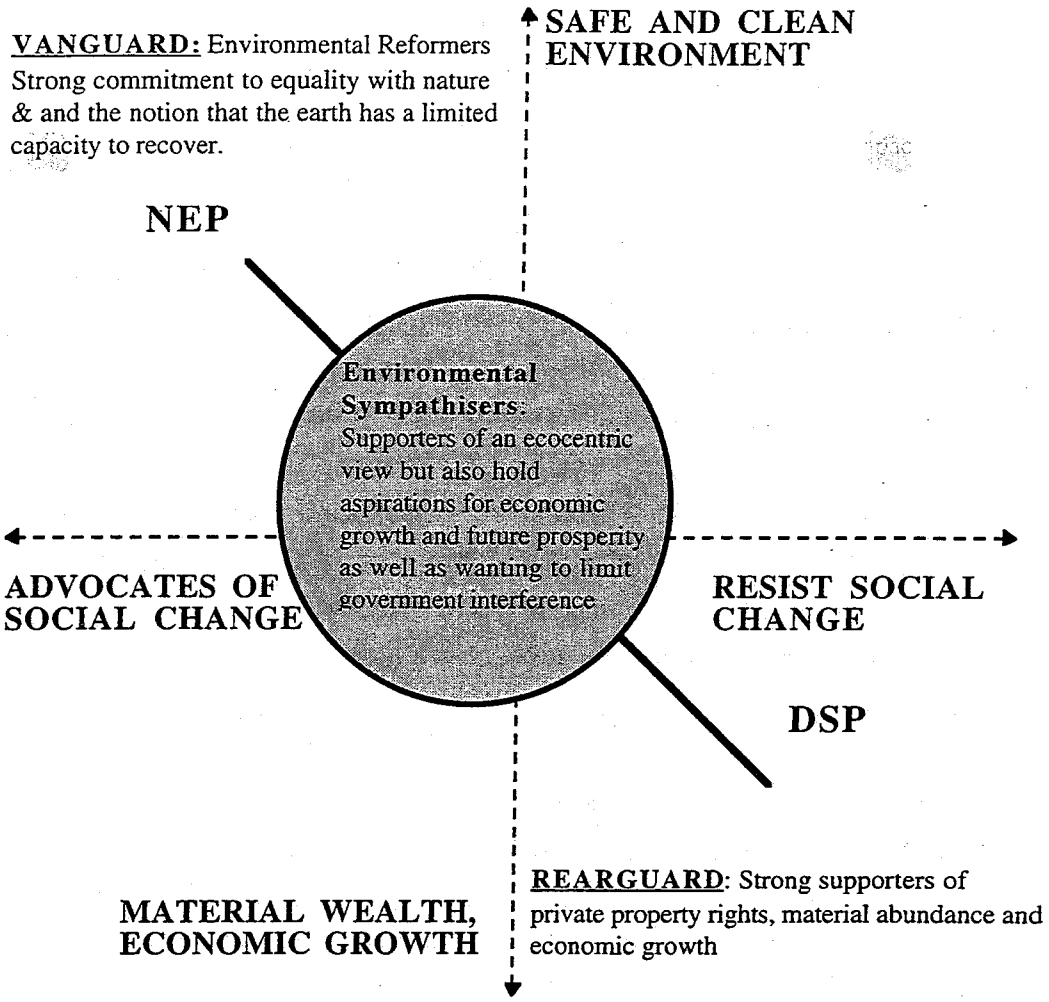

Figure 13.7 Spatial representation of respondent positions with regard to the DSP and NEP. (Adapted from Milbrath, 1985)

13.5.3 Differences in these *Shared* Representations and *Collective* Understandings of Social, Cultural, and Environmental Issues

Environmental-Contextual Dimension Respondents' anthropocentric belief system and value orientation were found to be linked to the environmental-contextual factor, place of residence. For example, endorsement of the conventional anthropocentric viewpoint was most prevalent amongst the semiurban respondents (the Mission Beach community sample ; Figure 13.3). The significant difference between these residents and the urban community (the Townsville community

sample) is inconsistent with the notion of a rural/urban - conservative/liberal dichotomy in the conventional anthropocentric belief system and value orientation. Instead, the findings suggest that this North Queensland rural community surveyed (Granadilla) does not conform to the stereotype of the ultra conservative, anti-environment right. This finding, together with the lack of a difference according to community and residence in the NEP score, is consistent with Fortmann & Kusel's (1990) argument that the 'greening' of the population has extended to rural communities such that differences between rural and urban environmental values are now diluted if not extinguished. In addition, the findings suggest that inconsistency between the anthropocentric and ecocentric views is predominant amongst the semiurban residents surveyed. A closer look at the underlying dimensions of the DSP identified limiting government interference as having the strongest support base in the semiurban community (Figure 13.4). Although support for private property rights was not evident in any of the communities, an interesting though expected finding was that the rural residents were significantly more supportive of these rights than the urban residents, but not more supportive than semiurban residents.

Social-Situational Dimensions Findings for the social-situational dimensions that are noteworthy include the lack of association between gender, age, years of residence and group membership and the two belief systems and value orientations, further demonstrating the limited predictive value of such factors as advocated by Jones and Dunlap (1992). These findings were both consistent and inconsistent with many of the studies using the NEP scale (see for example, Blaikie, 1992; Jones & Dunlap, 1992; Stern et al, 1992; Van Liere & Dunlap, 1980).

The most surprising in this set of findings were the group membership results. Belonging to a conservation organisation did not differentiate respondents' anthropocentric and ecocentric views. This is contrary to the assertion of social representations theory which claims that *shared* representations (such as belief systems and value orientations) are fundamental to establishing group identities (Augoustinos & Walker, 1994). In this study, these particular *shared* representations of the social and environmental world were not confined to members of conservation groups. A possible explanation is the phenomenon of "greening". Such a finding further supports the notion that the phenomenon of "greening" is widespread (Buttel, 1992; Jones & Dunlap, 1992). Membership of a conservation organisation therefore may no longer be a valid indicator of this phenomenon (Doyle & Kellow, 1995). The popular perception that formal membership of a conservation group constitutes the environmental movement, environmentalism, is a "limiting analytic construct" (Doyle & Kellow, 1995). In fact, many who are sympathetic to the environment appear to be avoiding such formal

membership. An explanation for this was evident in many of the respondent's own comments which illustrated the negative stereotyping of "greenies"; for example, "I like the environment but not radical greenies". This is consistent with the findings of Bragg (1995) who also found evidence in her North Queensland study of strong pro-environmental understandings amongst farmers being linked to these types of comments. Membership in such a group in a small community also appears very problematic. In addition to the negative stereotyping of conservation organisations, conservation membership does not guarantee a lack of inconsistency in environmental values nor conflict in belief structures. Doyle and Kellow (1995) argue that, in Australia, as elsewhere in the world, the environmental movement is diverse, containing within it 'many ambiguous and conflicting objectives' and therefore cannot be assumed to be characterised or bound by one unifying belief structure.

The only social-situational factor for which differences in responses to the two composite underlying belief system and value orientation scores were evident was education level, with DSP scores being highest among respondents with primary and secondary education levels. These respondents were in fact the strongest defenders of laissez-faire government in addition to showing the greatest support for the role of science and technology in solving problems. This endorsement of the beneficial effects of science and technology could be suggestive of the lack of knowledge and understanding these respondents have of the limits and dangers of science and technology (O'Riordan, 1976a). The nature of the association between education level and the NEP was inconsistent with many previous studies in that in this North Queensland sample the *lowest*, primary and secondary, and the *highest*, university educated respondents were equally less committed to this ecocentric view. This left TAFE educated respondents with the highest commitment scores. In other words, commitment to an ecocentric view does not necessarily increase with education, in fact it appears to decline at the highest level. This response pattern is similar to the results for *attitudes toward cassowaries* (Chapter 12). In searching for a possible explanation for this decline amongst the university respondents, Orr's argument (1994) that higher education is no guarantee of 'decency, prudence, or wisdom' seems most appropriate. In questioning what was wrong with contemporary education, he came to the conclusion that it was not education in itself that was the problem, rather it was the type of education. Fien's 'education *for* the environment' (1993) seeks to address this current crisis in education.

The limited value of the socio-situational variables as possible determinants of the two belief systems and value orientations also reflects the *shared* and *collective* nature of social, cultural, and environmental understandings currently present throughout the community. It would appear from these results that not only is the degree of the

respondents commitment to the anthropocentric view moderate, and support for ecocentric values considerable, but that the sectors of society from which these levels of commitment are drawn are extensive. For the ecocentric view this finding is consistent with Milbrath's (1985) argument that "almost everyone values nature".

13.5.4 Implications for Environmental Management and Endangered Species Recovery

Many of the issues raised in this analysis have important implications for environmental management in general and the management of endangered species in particular. Firstly, the particularly strong commitment to the belief system and value orientation embedded in the New Environmental Paradigm and its widespread endorsement, once again (see Chapter 12) identifies a strong environmental support base across this North Queensland population sample. Without such fundamental support even the least controversial management strategies will fail (Wondolleck et al., 1994). However, in addition to a general awareness that support exists, knowledge of the dynamics of this public support base (that is, the nature, magnitude, and the "barriers" to or at least "moderators" of this support base) is critical to policy development and implementation (Clark et al., 1994; Howell & Laska, 1992; Wondolleck et al., 1994). Such information can identify areas of potential conflict, particularly between the management agencies, the general public and particular stakeholders, as well as areas of general endorsement, policy implementation impasse, etc.

In this study the issues on which this support base is founded highlight the areas of trade-offs between pro-environmental belief systems and value orientations and other widely held values such as limited government interference, supporting economic growth, material abundance, private property rights, etc. (Van Liere & Dunlap, 1980). The findings suggest that this environmental support base is not entirely unconditional. In fact, there are a number of underlying sets of beliefs and values that can be characterised as "barriers" to and/or "moderators" of a pro-environmental stance. The challenge for management agencies is to either work with or displace those aspects of the DSP which are still constraining the way people think, live and behave toward the natural environment. It is arguable that a prior knowledge of this substantial community agreement for basic environmental conservation issues might have led to very different strategies with respect to the Wet Tropics World Heritage listing and the Port Hinchinbrook confrontation.

Despite overwhelming support for environmental values, it is evident that a distrust of government interference is a concern of this North Queensland population sample. Postmodernist theory suggests that such a distrust reflects a general decline in public confidence in government and government institutions which is now not unusual in highly industrialised societies (Inglehart, 1995). Inglehart presents two reasons for this growing public suspicion: (1) diminishing effectiveness; and (2) diminished acceptability of government institutions. The anti-government interference stance taken by the majority of respondents has important implications for environmental management because of its link to issues such as restrictions, regulations and personal rights, and hence agency-public conflict. However, given the combination of the strong commitment to environmental values, and the lack of support for issues such as private property rights and individual rights across all communities, management agencies have a sympathetic and supportive community to work with which can be maintained, if at the same time the strong community support for limiting government interference is acknowledged.

As government institutions responsible for restricting and regulating human interference with the natural environment, the challenge for environmental management agencies is to overcome any lack of trust the public may have in their interference or decision-making abilities because, whatever their judgements, they will most probably be treated with scepticism (Wondolleck et al., 1994). Adopting innovative strategies that maximise protection of the natural environment but minimise the perception of government interference, and hence the potential for public-agency conflict is one possible way forward.

With a majority of the respondents likely to be antagonistic toward a strict regulatory regime, the findings of this study reinforce the need for environmental management agencies to work in "collaboration" or "partnership" with the public, a management strategy that is now widely discussed (e.g., Lane, 1994; Selin & Chavez, 1995; McElveen & Klay, 1991; Western & Wright, 1994), if not adopted by many agencies (e.g., Walters & Renard, 1992; WTMA, 1995), and even a mandate in many environmental decisions (Vining, 1992). As Wondolleck et al. (1994) point out, "decision-making approaches that seek to institute a process of ongoing collaborative problem solving among diverse stakeholders can at times build the understanding, support, and carefully crafted decisions needed to achieve effective on-the-ground action" (p. 307). However, the findings also suggest that this "collaborative" effort or "partnership" should not be confined to the involvement of representatives of particular groups within a community, since 67% of respondents are not affiliated with any group, be it social, business, community, or conservation (Chapter 11, Section 11.2.3.3). A collaborative strategy that was restricted to representatives from groups could therefore

privilege certain people, for example, resulting in an over representation by highly vocal groups (Vining, 1992) and leaving a public majority of no group affiliation with no voice, no input. Such a situation provides the potential for prolonged and antagonistic conflict. An alternate or perhaps additional strategy for assessing such majority but potentially silent opinions and which achieves genuine collaboration and representation is survey research[7].

A final noteworthy finding that has direct implications for endangered species recovery is the general lack of support for private property rights. This is particularly important as views on property rights are considered to "profoundly influence responses to proposals designed to protect the environment" (Dodds, 1994, p.47). In addition, species become endangered largely because of habitat loss (Caughley & Gunn, 1996; Dobson, 1996; Meffe & Carroll, 1994). The responses of the rural respondents are particularly salient as they represent the largest land holders and therefore are the group most likely to be affected by proposals that restrict land use activity. The present findings suggest that community respondents do not endorse property rights at the expense of the environment or the public good. Management agencies therefore have a vital group within this North Queensland community essentially accepting the possibility, logic, and need for restrictions on land use activity. However, the issue of private property rights is particularly important as it is also strongly and negatively associated with pro-environmental belief systems and value orientations. Understanding the public view on this issue remains a fundamentally important consideration.

[7] This issue of "collaborative" management will be addressed in detail in the final section of this dissertation.

Chapter 14

A Focus On Environmental Concern:

An *Individual* and *Community* Perspective of the Natural Environment

14.1 Introduction

The preceding two chapters began the exploration of the human component of the ecosystem by examining theoretically and empirically two quite specific but conventional ways of framing the human component of the ecosystem, attitudes and underlying belief systems and value orientations. In introducing a third concept, *environmental* concern, this chapter continues this exploratory endeavour with the aim of broadening the system of explanations of *individual* and *community* responses to the natural environment, and hence increasing our understanding of *humans* and *human systems*. The fundamental difference between environmental concern and the concepts used in the preceding two chapters is that attitudes, underlying belief systems and value orientations were investigated following a more conventional process of scientific research, that is, theoretical frameworks and measurements for these concepts were identified prior to the research effort. In contrast, the consideration of environmental concern has evolved as a "post hoc" consideration.

When embarking on this research project, environmental concern was not a concept originally proposed for the exploration of the human-natural environment interface, rather it grew out of the very process of this research itself. Essentially it has evolved out of the frustration experienced when trying to conceptually disentangle and theoretically frame a concept that was believed to be very different from environmental attitudes and underlying belief systems and value orientations, and yet, in the context of most of the literature reviewed, was consistently embedded within the attitude domain and the DSP and NEP framework. A theoretically, conceptually, and analytically disentangled environmental concern therefore presented itself in the course of the research as potentially another logical and reasonable way of exploring the human component of the ecosystem. After all, as will be argued in this chapter, an important construct which drives conservation behaviours and support for conservation actions relative to endangered species recovery is concern about the natural environment, including both *individual* and *societal/community* concern.

Another important feature of a focus on concern is that it allows the researcher to better tap into how people represent the natural environment to themselves and others. Not only is concern closest to behaviour, it is also a variable that has a certain ecological validity in that it relates to how people see and understand their everyday environment. Concern is not an abstracted construct that derives from a particular theory, rather it is a practical construct that accommodates cognitions, feelings, and motivations and relates directly to individual and shared experience as well as to decision-making of environmental managers. Lay perceptions and judgements of risk or concern are important indicators of ecosystem well being. They are also politically astute signals for the environmental manager interested in community perceptions.

People living in the natural environment are sensitive observers of change and impacts and focus in on particular barometers of negative impact as areas of "concern". The well being of the cassowary appears to be one of these features and perceptions of environmental well being that clearly influence perceived environmental quality. In addition, environmental concern provides a valuable means of assessing the social science and environmental psychological attempts to come to terms with the environmental domain generally and natural environmental degradation and protection particularly. The language and discourse on environmental concern also provide a link between the natural and social sciences, and between social science and environmental and resource management. The problem is that the different disciplines are using the same words but often do not share the same understandings or meanings. Although this concept must be viewed as a "post hoc" consideration with respect to the instrument and study focus, it does present an alternate way of looking at the data set.

14.1.1 Chapter Outline

This chapter begins with an overview of issues considered most relevant to why environmental concern is such a useful construct within the context of the present study. Again the central theme is environmental management. Several issues which highlight its appropriateness and utility to environmental management are considered. A brief note as to the significance of environmental concern beyond environmental management is also included. The next section of this chapter endeavours to clarify, conceptually and operationally, an environmental concern framework, one that can examine this North Queensland data set in an alternative yet potentially valuable way. In the process, an attempt is made to precisely define what is meant by the environmental concern construct and how this construct has been operationalised, in a post-hoc fashion, in the context of this study. The final sections of this chapter outline the results, discussion and conclusions.

14.2 The Importance of Environmental Concern

Concern about the well being of the natural environment, local and global, has remained a salient and critical issue around the world (Dunlap et al., 1993; Gooch, 1995; Skow, 1995). This is reassuring, though somewhat remarkable, given the urgency and criticalness of other concerns in people's lives, such as unemployment, natural disasters, crime, and war. It also, however, says something about the perceived critical and all-consequential status of many ecosystems, and the shared understanding that these are ultimately the planet's life-support systems. As Reser et al. (1996) point out:

> Concern is a much-used and seemingly central concept and term in the context of environmental problems, environmental management, environmental impact assessment, risk assessment and decision-making, and conservation and behaviour change initiatives. (p.4)

These comments further highlight many of the reasons why, in the context of this research, a focus on environmental concern is important. The most salient considerations are outlined in Table 14.1.

Table 14.1 Salient considerations of concern.

a)	**concern** embodies and reflects knowledge, values and self interest and involvement;
b)	**concern** is what ultimately motivates an individual or community to act;
c)	**concern** is an integral component of perceived environmental quality;
d)	**concerns** are a critical consideration in conflicts of interest;
f)	**concerns** have dramatic political and moral currency;
g)	**concern** relates directly to risk assessment and planning considerations;
h)	**concern** is arguably what is at particular issue in any calculation of anticipated costs in the context of environmental impact assessment, and environmental threat;
I)	**concern** has strong intuitive appeal because it provides a clear rationale for environmental management initiatives aimed at changing people's behaviour.

Source: Reser et al., 1996.

14.2.1 An Appropriate Concept for Environmental Management

Environmental concern is considered an important and eminently appropriate concept for environmental management. As a broad-based concept it provides a rationale around which many environmental management issues can be addressed. The following overview presents a selection of factors which highlight the appropriateness of this concept in the context of environmental management.

14.2.1.1 Its Link to the Environmental Crisis

Open any book that addresses the environmental crisis, be it extinction of species, air, water or land pollution, energy consumption, land degradation, waste disposal; listen to any conversation, watch any television program, read any newspaper that address these issues, and the term *concern* is bound to arise. Concern for and about the environment is why there is widespread acceptance that a crisis in the environment exists, the first critical step toward environmental management. Concern is a term signifying that not all is well, it epitomises a dysfunctional system, it is a culturally constructed domain of danger, and is part and product of the human response to environmental degradation (Reser et al., 1996). As such, "concern reflects cultural meaning systems which frame and define the relationship between human and natural ecosystems" (Reser et al., 1996, p.44). Without concern there would be no crisis.

To conservation biologists, concern about the biodiversity crisis epitomises the very reason for the existence of their discipline, referred to as a "crisis" discipline (Soulé, 1985). Central to the reasons Moritz and Kikkawa (1994) gave for "Why do we need Conservation Biology?", is the expression of *concern* for the substantial environmental problems in the region. The primary environmental crisis in this research is the possible extinction of a species. Concern for the well being of this species is seen as a critical indicator of how such a crisis is perceived, represented and understood by the individual and the community, and as a consequence what actions are likely to be taken in the future by both management agencies and the public to prevent the extinction of this species.

14.2.1.2 Its Link to Public Opinion, Politics and Environmental Management

Cotgrove (1982) notes that a formalisation of public concern for the environment in America and the United Kingdom dates back to the 1890s when public interest groups

were established to promote environmental protection hence linking public opinion on the environment and politics. Many individuals and scientific groups were expressing concern well before this, urging governments to take action to protect the environment (Grove, 1992). However, this concern remained within the confines of the select scientific communities. In this century, many considered that public awareness and collective concern for the environment peaked in the late sixties, early seventies only to be followed by a decline in the mid-seventies (e.g., Cotgrove, 1982; Dunlap & Mertig, 1992; Geller & Lasley, 1985, O'Riordan, 1976a). Others describe this period as one in which environmental concern stabilised (Wall, 1995). Furthermore, there were those who saw this period as just another major benchmark for environmental consciousness (Krause, 1993), with concern increasing ever since the sixties (Fien, 1993), reaching "unprecedented levels throughout the world" in the 1990s (UNEP, 1988, in Fien, 1993, p.3). That public concern about environmental problems has grown is beyond doubt (Witherspoon & Martin, 1992). With concern ever present, it is therefore likely to have appreciable impact on public opinion, politics and ultimately environmental management.

Public opinion assumes considerable importance (Eckersley, 1992). It is known to be a powerful political, economic, and moral force (Evernden, 1992; Reser et al., 1996), driving a whole mechanism of national policies (Doyle & Kellow, 1995), because elected officials must seriously consider prevailing public opinion when they enact legislation (Eckersley, 1992). What is significant about the period from the 1960s to the present is the extent to which concern, embedded in this "shared" or collective opinion, was translated into a social movement and public behaviour in the form of environmental or "green" political activity and public policy. This is clearly demonstrated in the emergence of the environmentalist movement and "green" politics as a major force throughout the Western world during the last few decades (Bowlby & Lowe, 1992; Doyle & Kellow, 1995; Forgas & Jolliffe, 1994; Gottlieb, 1993). Such a movement documents the changing face of environmental concern (Reser et al., 1996).

Most politicians have taken up the environmental cause; in fact, nobody running for office these days can afford to take an overly anti-environmental stand (McNeely, 1992; Young, 1991). Concern for the environment, firmly embedded in this public opinion, has indeed been translated into important political commitments, such as environmental legislation, policy, and law (Shabecoff, 1993), thereby becoming one of the most important political issues in the last few decades (Forgas & Jolliffe, 1994). In turn, those who are in the service of State and Federal Governments, for example environmental managers, find themselves being directed by and having to respond to the political masters of the day.

14.2.1.3 Its Multiple Use

Concern is a concept frequently referred to in a number of areas of environmental research conducted within the context of many disciplines, in particular, the social and natural sciences. It encompasses such diverse fields as environmental psychology and environmental philosophy (e.g., Attfield & Belsey, 1994; Hackett, 1995; Naëss, 1989; Stern et al., 1992), conservation biology and environmental management (e.g., Forey, Humphries & Vane-Wright, 1994; Grumbine, 1992; Meffe & Carroll, 1994; Moritz & Kikkawa, 1994; Spellerberg, 1992; Park, 1980; Wilson, 1988), environmental education (Fien, 1993), sociology and geography (e.g., Dunlap & Van Liere, 1978, 1980, 1981, 1984, O'Riordan, 1976; Pepper, 1996; Redclift & Benton, 1994). With this broad spectrum of application, it is obvious that concern for the environment is considered by all to be an important concept. The problem is that all of these disciplines are using the same words but often they do not share the same understandings or meanings. Nevertheless, the language and discourse on environmental concern generate much debate about issues central to the environmental crisis and common to all disciplines. In this way they provide an important link between the disciplines, social and natural sciences, and social science and environmental and resource management.

Concern for the environment also has an important place in popular culture. It is a term which has considerable exposure through numerous communication channels. All forms of the mass media continue to give reference to environmental concern and concerns on a daily basis. As a result such terms have become part of an everyday language for the general public. Concern is as much a colloquial term as a scientific one.

14.2.2 The Contribution of Environmental Concern to Environmental Management

Environmental concern is seen as an important construct with which to frame the issues most relevant to an environmental management process which plans to operate at the human-natural environment interface. In general, environmental management agencies "operate under the duality of contradictory mandates. These mandates embody the conflict between biocentricity and concerns for preservation, and anthropocentricity and the reality that political and economic support for management programs comes from resource use (both consumptive and noncomsumptive)" (Wright et al., 1991, p.51).

Firstly, the challenge for environmental management agencies is the management of people, at individual, community, and regional levels. This requires an understanding of

basic and relevant behavioural constructs and perspectives. Environmental concern would seem to constitute a particularly useful and intuitively valid construct. However, because it has retained a loose, folk status, with few social scientists carefully defining the construct at either a conceptual or an operational level, its incorporation in environmental management has been difficult. Secondly, a central task of environmental management agencies is that of measuring and monitoring where local and regional communities are at with respect to the perceived status of the natural environment - and the policies and performances of management agencies. Again, environmental concern would seem to be a critical parameter here. A third objective for environmental management agencies is to educate the community about, and "interpret" the environment in question, in the hope that it will enhance appreciation and satisfaction, as well as change behaviour in a more environmentally responsible direction. Concern about the natural environment is also a central and motivating construct and variable with respect to this endeavour.

Environmental management agencies must, ultimately, establish a common base with respect to measures of impact, and ecosystem status and health. To date the measures employed have been understood as either exclusively natural science-based or as "social" in a rather loose and trivial way. This totally ignores the psychometric base of virtually all objective environmental indicators, and the importance of cross-validating existing natural science-based indicators with resident and user perceptions of environmental well being and change.

14.2.2.1 Environmental Concern and Environmental Impact Assessment

Environmental concern and environmental impact assessment are closely linked because *concern* about proposed developments and their potential impact on the environment can determine both whether a proposal will proceed and community responses after-the-fact (Reser et al., 1996). Such community and individual *concern* draws attention to the potential impacts of a proposed activity, be it land clearing, residential or tourist development, mining, etc. A heightened awareness is therefore initiated by such *concern* which often then leads to calls for a formal environmental impact assessment if one is not already in place. In addition, such concern is most often reflected in the anticipatory or perceived potential threats of an activity (Gramling & Freudenburg, 1992), an awareness of consequences of that activity either to self, others or the biological system (Stern et al., 1992), both of which can lead to considerable anxiety and stress for the individual and across the community (Cvetkovich & Earle, 1992; Hallman & Wandersman, 1992).

Another important issue with regards to "public" concern in the context of environmental impact assessment, monitoring, and environmental management in general, is the identification of who constitutes the "public". Environmental management agencies have tended in the past to define the "community", "public", or "stakeholders" as those who are in some way directly linked (in a utilitarian sense) to the specific environment or issue being considered, thus privileging particular people and settings. Little recognition has been given to the "millions of *vicarious users* .... for whom the existence of pristine and undamaged symbolic heritage areas is an integral component of perceived environmental quality" (Reser et al., 1996, p.5).

14.2.2.2 Decision Making and the Policy Process

While debates regarding habitat protection, endangered species, protecting the gene pool, etc., continue to be in the public eye and drive policy and program formulation, an additional useful strategy for environmental managers is to consider the *concerns* of the human population. These include a diverse range of concerns, ranging from the impact of management strategies such as restrictions and regulations on livelihoods to concern for the environment for its own sake. All of these concerns play a critical role in the successful implementation of policies and programs, since failure to consider the human aspects of environmental management, such as their *concerns* , "is likely to lead to less than optimal results in even the best-planned programs" (Wright et al., 1991, p.45). For example, in the context of this research, *concern* for the survival of a species is clearly a core issue for any environmental management agency whose aims are the preservation and recovery of that species.

As a social indicator of the status of such an environmental crisis, public concern provides a benchmark for management decision making and action. Equally important, however, is for the environmental manager to be knowledgeable of specific public concerns such as anxieties about the personal impact and costs of the decisions made and the policies formulated. These are very salient concerns and, if ignored or unattended to, can be potentially devastating for the environment, as in the phenomenon of "pre-emptive" clearing of land which was evidenced in the clearing of critical cassowary (Chapter 9, Section 9.3.6), and mahogany glider habitat in North Queensland.

Finally, public concerns are also a critical measure in any evaluative research with respect to the ongoing impact of an intervention strategy. Evaluation of the effectiveness, efficiency, and equity of management policies and programs is an important indicator of the success of such policies and programs. Feedback from the public through their

concerns can be used to "fine tune" a program (Wright et al., 1991). Environmental managers therefore need timely, accurate, and adequate information on the human population as a basis for decision making. Concern is a concept which can assist in building up that information base.

14.2.3 Beyond Environmental Management: A Broader Significance

14.2.3.1 The Contribution of Concern to Social and Environmental Psychology

An investigation of environmental concern may well contribute to further developments in social and environmental psychology in a number of ways. It can contribute to important debates within social and environmental psychology, in particular, those which involve theoretical and methodological developments in natural environment research such as human-natural environment transactions, environmentally responsible behaviour, and the general issue of conceptualisation and operationalisation of constructs. For example, an adequate conceptualisation of concern forces us to rethink current models of attitudes and behaviour change, particularly in the environmental domain. It also forces us to focus more closely on how media use and treat such concerns. In addition, it allows us to better understand how social indicators can and do reflect community concerns, and how these can be more sensitively measured. Furthermore, developing consistent measures of concern allows for comparative research and monitoring of change to be conducted. And finally, a critique of social science use of environmental concern might well raise questions with regards to central principles of many of the disciplines.

As noted previously, environmental concern provides a valuable window on social science and attempts by social and environmental psychology to come to terms with the "environmental" domain generally, and "natural environmental" degradation and protection particularly. This is an area of applied research interest which is expanding rapidly, a consequence of continuing and problematic human-natural environment transactions which result in ever-increasing environmental degradation. Because environmental concern motivates human response to environmental conditions (Reser et al., 1996), it also raises questions about representation and predictive theory. For example, an objective for employing the construct environmental concern in social science research would be to measure and monitor public perceptions, representations, and understandings of this construct. An additional goal is the prediction of human behaviour, in which case a estimate of environmental concern alone is limiting. It becomes increasingly useful when it is applied in concert with other attributes.

Reser et al. (1996) highlight some compelling theoretical reasons for reviewing the nature and status of concern in the context of environmentally responsible behaviour. As they suggest, "A careful consideration of a notion like 'concern' allows us to think laterally about process and motivation, appraisal and action, while momentarily standing back from more conventional social psychological and sociological constructs and models, such as attitudes and ideologies" (p.5). They go on to highlight that concern for the environment is considered as the "core motivational construct" for environmentally responsible behaviour - it is what ultimately motivates an individual or community to act This promotes the view that concern for the environment is positively related to environmentally responsible behaviour. Underlying this environmental concern - environmentally responsible behaviour linkage is the assumed causal chain: the more aware → the more concerned → the more motivated → the more likely to behave in environmentally responsible way. Investigating this concern-behaviour relationship provides a means of better understanding the factors that guide environmentally responsible behaviour.

Environmental concern is a term which has been used in multiple discourses. Such use obviously carries the burden of multiple meanings and functions. This has resulted in a state of considerable confusion across the social sciences, particularly in the field of social and environmental psychology. In the absence of clear conceptual and operational definitions different users develop independent, even inconsistent, definitions. By this stage, the concept represents a non-concept because it carries so many different meanings that one can never be sure which is intended at any one time. Concern illustrates several common characteristics of troublesome concepts in social sciences. It defies categorisation because it is a multifaceted concept. Like attitude and values, it is one component of a network of concepts slowly blending into one another. Repetition and familiarity have also contributed to the state of confusion because they have made us so uncritical of the term that it has become accepted as the concrete property of these multiple discourses. Furthermore, "the expression has been hijacked by a more sociological and political discourse in which its status and meaning is that of a portmanteau concept for any public attitudes toward environmental issues" (Reser et al., 1996, p.5). Social psychology is dominated by complex and inadequately defined terms which confound the development of the discipline. Conceptual and operational clarification of terms such as *environmental* concern, environmental concerns, concern for the environment is therefore critical. The cost for social science otherwise is too great. As Peters (1991, p.xx) points out, "Although non-operational concepts play an important role in the creation of scientific theory, scientific relationships must be built upon operationally defined classes, variables and relationships, because operational definition relates the constructs of science to the phenomena of the real world."

14.3 Toward an *Environmental* Concern Framework

14.3.1 Understanding and Framing Environmental Concern

How best to examine relations between humans and their natural environment is central to understanding and framing environmental concern. This concept is important to natural science, social science, in particular, environmental and social psychology, and environmental policy and management, and indeed provides a basis for promoting integration among these fields. In this research, environmental concern is considered within this human-natural environment framework.

14.3.1.1 The Nature of Environmental Concern(s)

According to Reser et al. (1996), "Concern is clearly part and product of a human response to and/or judgement about a situation, circumstance or event" (p.34). The "judgement" they refer to as a specific case of appraisal and coping or threat response (e.g., Lazarus, 1991; Bell et al., 1996), and the "situation" as complex, encompassing, long-term and ongoing. Concern in general is seen to differ from constructs such as attitude, belief and value in that it is identified as a *resultant state*, reflecting a considered perception, judgement/appraisal and/or belief that something valued is at risk.

Environmental concern is considered as a specific case of apprehension, reflecting an assessment or judgement that an environment or an aspect of an environment is at some risk or danger. In this instance, that which is at risk is typically an inclusive environmental or ecological system, a feature or species including humans, ecological integrity and viability. Such concern is arguably the composite product of explicit and/or implicit risk assessments, which include weighting of the magnitude, probability, immediacy, and personal and environmental impact of the threat.

Environmental concern and behaviour Implicit in the notion of environmental concern is the *need* and *motivation* to do something, to respond in an active way to the concern. In directly prompting an actual response (actual behaviour), concern, in contrast to attitude, belief and value, can therefore be argued to be closest to behaviour. Nevertheless, in spite of the proximity of concern to behaviour and the powerful emotional and motivational forces that can accompany concern, there is a set of problematic, complex and poorly understood relationships between the nature and level of concern and subsequent behavioural response. Being "concerned" is not in itself

sufficient for engaging in desired behaviour. The literature of the last four decades on natural disaster warnings, health psychology, and protective motivation does not indicate that salient risk is necessarily followed by adaptive behaviour. In addition, people also need to feel that a concrete behavioural response is available and potentially effective and has the endorsement of others as a responsible and necessary action. Therefore, issues such as perceived control, perceived responsibility, self efficacy, knowledge of what to do, and the relative importance of competing concerns, social norms and values can be "barriers" to the translation of concern to behaviour (Axelrod & Lehman, 1993; Mohai, 1985). The reality with respect to many ecosystem threats is that they are subtle, cumulative, nonpersonal, and contextual, and pose formidable problems in terms of perceived individual control and self-efficacy.

A genuine concern about the natural environment is an important and prerequisite precursor to environmentally responsible behaviour, incorporating the recognition that a **threat is real**, the judgement that **action is necessary**, and the experience of at least some **personal responsibility** for or to. Such concern is also that which is most attentive and sensitive to negative impact, to problematic feedback from the environment as suggested by Stern (1992). In brief, environmental concern is an awareness that something is wrong, that a system is in trouble, and that something should be done.

14.3.1.2 The Components of Concern

With respect to a situation which elicits concern, there is clearly some component of ***salience*** and some ***measure of perceived risk or threat.*** It is arguable that that which is at risk or threatened must also be ***valued*** and/or value relevant in some way; if it were not, the situation would presumably not engender concern. Finally, in most situations of concern, there is some measure of empathy or ***self involvement,*** investment in terms of concern for or about, and probably some degree of ***felt responsibility for, or felt responsibility or need*** to do something. Obviously defining environmental concern requires a fine-grained analysis of psychological process and resultant state. It also requires an analytic distilling of how concern about the well being of the natural environment, for example, is different from other concerns, environmental and otherwise.

Most attempts to conceptualise and measure concern have focused on more cognitive, belief components, for example, beliefs about the nature and magnitude of particular environmental problems, or endorsement of space-ship earth ecological understandings. Few researchers have discussed or operationalised affective concomitants or motivation,

or indeed the individual *experience* of concern about the natural environment. This seems anomalous given the stress and coping nature of threat appraisal, and the fact that it is feelings that confer "reality" to perceptions and representations (e.g., Reser & Smithson, 1988). From phenomenological, emotional and motivational perspectives, concern about the natural environment may be much less clearly "defined" or mediated in terms of specific cognitions, but may constitute a powerful affective and empathic response to and representation of a system under threat, of something disturbing and wrong with respect to the functioning of the world. Clearly this is a perspective strongly held by ecological psychology (Reser, 1995a).

14.3.1.3 A Taxonomy of Environmental Concern(s)

From the literature and social science studies reviewed (Appendix B.4.1), the evidence suggests that researchers and respondents identify different objects or targets of concern. Environmental concern is understood by many to be a concern about the well being of the biosphere - the physical, non-human environment. However, in addition, people are concerned about this well being in part because the human environment and life-support system may be threatened. Based on this, two core objects or targets of concern have been distinguished. These "life areas" (Hackett, 1996), "orientations" (Stern et al., 1993), or objects/targets of concern have been classified as concern about and for the biosphere for its "own sake" *(ecocentric, biocentric),* and for the sake of self and others (*egocentric/anthropocentric altruism, socialtruistic*) (Eckersley, 1992; Thompson & Barton, 1994; Stern et al., 1993).

Environmental concern also includes concern about human activities which impact, negatively, on the natural and social environment, and in this respect is a concern about human behaviour. Environmental concern*s* on the other hand tend to be more specific and focused with respect to identifiable problems and causes of negative natural and social environmental impact. The ecocentric- egoistic/anthropocentric distinction is assumed to provide a broader explanatory basis of environmentally responsible behaviour with anthropocentric/egoistic potentially identifying both the "barriers" to and "motivators" of behaviour.

Table 14.2 attempts to categorise these domains of concerns, referred to in the literature as environmental concerns.

Table 14.2 A taxonomy of environmental concern (s).

1)	**concern** for natural environment and ecosystem well being, including other species (ecocentric, biocentric)
2)	**concern** about the negative impact of environmental degradation on people generally (anthropocentric altruism, socioaltruistic)
3)	**concern** about more immediate personal impacts of negative environmental feedback in terms of the health and well being of self and close kin (egoistic)
4)	**concern** about economic and lifestyle costs either directly related to environmental deterioration or as a consequence of implementing environmental protection and restoration interventions (egoistic)
5)	**concern** deriving from conflict between core values and/or beliefs and what is happening to the natural environment, and discrepancies between own values and own environmentally consequential behaviours (egoistic).
6)	**concern** about natural disasters and human impact (natural environment as threat and causal agent)
7)	**concern** about technological disasters and human and natural environmental impact (anthropocentric and ecocentric)
8)	**concern** about negative impact on the human-made or human-altered environment (e.g., the destruction of heritage building or forest regrowth on agricultural lands)

Source: Reser et al., 1996.

The classification reflects the reality that environmental concern can refer to a number of domains of concern. An evaluation that specifically addresses the ecological/biospheric domain would reflect an expression of concern for the well being of the natural environment for its own sake, not for the sake of human beings. Other concern evaluations are less directly about natural environmental well being but are implicated in terms of one's response to perceived ecosystem problems in terms of their effect on the physical and psychological health of self or others. All of these latter concerns can arguably be referred to as *environmental* concerns and are often core considerations in environmental assessment, but they are clearly very different in kind from the concern associated with visible natural environmental degradation, river pollution, habitat loss, species loss, etc.

It is interesting that these different types of concerns can occupy very different positions in models of environmental perception or attitude formation and change. Individual response to pollution, for example, may constitute a salient environmental cognition and feeling, whereas concern about personal costs or the opinion of others constitutes a "barrier" to engaging in pro-environmental behaviour.

As well, one can further classify both the types of environmental problems and types of concerns in terms of local/global, immediate/short term/long term, obvious/hidden, personal/shared, etc. Another way to think of the above classification is in terms of functions served, as in functional approaches to attitudes (see Herek, 1986). Much of the discussion of environmental concern in the literature does not attempt to specify whether the concern being debated is conceptually or geographically global or local, and, less frequently, whether the discussion is about particular concern*s* or a generalised concern. Clearly this makes a difference. Individual representations of a particular local and specific concern (e.g., the extinction of a species), may colour one's representation about national environmental quality or the magnitude of general environmental problems, but they are not the same thing and one is not necessarily a good indirect measure of the other.

14.3.2 Operationalising Environmental Concern

14.3.2.1 Language Use

With respect to language use, in the context of this research the expression *concern for* or *about* is used instead of *environmental* concern. Therefore, the expression environmental concern **is not** used or interpreted as concern for the well being of natural environments, ecosystem integrity, and the flora and fauna of natural environments unless clearly specified as such. This helps to get around the multiple meanings of "environmental" as an adjective, and allows for a specification of concern target. Concerns *for* other environments (such as the built or social environment), concerns *for* human well being, concerns *about* the potential threats from natural environmental forces on man-made environments or technologies, concerns *about* the human costs associated with natural environment degradation, concerns *about* the human costs associated with implementing environmental protection strategies, are designated as such, rather than being referred to as environmental concern. Such use, in addition to dealing with the problem of the multiple meanings of the adjective "environmental", more adequately conveys that we are dealing with a psychological process and state, not a collection of entities "in" the environment. While it is arguable that there is still a place for a

cumulative environmental concern measure, it is important to be clear about what this actually is and what is measured by the items used. If differing concerns are inversely related, a composite environmental concern score of course has little meaning.

14.3.2.2 Notes on Operationalisation

As noted in the beginning of this chapter, the research survey was undertaken prior to developing a critical perspective on environmental concern. The scales and items employed in the survey instrument were conceptualised as an attempt to measure relevant attitudes, perceptions and beliefs, as well as information levels. There was also a clear-eyed decision to employ several widely used measures to allow for comparison with other studies and to anchor this North Queensland research to accepted frames of reference. The review of the concern literature, however, and an interest in finding a way forward through a virtual forest of measures, meanings, and differing agendas, led to a decision to critically examine the data set from the perspective of "concern", and to see whether this might allow for a more useful way of framing the data or at least a way that could add to the system of explanations of the human-natural environment interface that was evolving through this research effort.

This somewhat unorthodox procedure allows for a rather different organisation and presentation of results. It is clear from the discussion so far that much of the survey and data collection was about concern, either directly or indirectly. Certainly, for example, the DSP and NEP scales have been used as measure of concern. As well, measures of perceived risk or threat to a species are very germane to issues of concern; all that is required is that, in addition to an appraisal of risk, there is some positive interdependent connection to that which is at risk. More broadly, if the target species is seen as playing an important role in, or indeed being critical to or reflective of ecosystem well being, then the perception of risk becomes a reasonable index of concern. Despite the limitations of working with a survey instrument after-the-fact to build up a concern scale, confidence in the ability of the instrument to provide adequate items to cover the theoretical and conceptual definitions of environmental concern as presented thus far, existed.

14.3.3 The Environmental Concern Scale Used to Examine this Data Set

Firstly, with respect to specifying and measuring different types of concern, the standardised taxonomy or classification of such concerns offered in Table 14.2, has been adopted. A particular focus has been placed on *concern about the well being of the*

natural environment. In turn, items have been selected from the survey instrument that measure this on both a specific or local level of analysis (using the endangered species, the cassowary), and general level of analysis (using a combination of general issues such as pollution, wildlife, and the Wet Tropics environment). In addition, items which measure other types of concerns considered important to understanding the human-natural environment interface were also clarified and selected. These types of concern included *concern about the economic and lifestyle costs* associated with implementing strategies aimed at conserving the cassowary (local issue) and the general environment (general issue); and *concern about the physical and psychological well being* of the self and others as a consequence of the loss of the cassowary (local issue) and environmental degradation (general issue). Items selected which tap specific concerns about the natural environment, both local and global, allow for a tapping of individual experience and *personal representations* of concerns.

Secondly, although the situation and target of concern provided the topics and hence classification of concern, it was necessary to construct a profile of individual and community concern about local and general issues by assessing self-reported level of concern in the following way:

1. awareness of consequences of the problems,
2. perception of personal, community, and environmental risk,
3. salience of this target of concern,
4. perceived impact of the problem on emotional well being and perceived quality of environment for self and/or others,
5. value worth of the target of concern,
6. whether or not one is actively involved in behaviours which are seen to address the problem.

The survey instrument was therefore scanned for items that could possibly measure these issues. Finally, based on this formula, a composite index of concern was constructed from the existing survey instrument. Detailed descriptions of these items and composite index together with exploratory factor analyses are outlined in Appendices B.4.2 to B.4.10.

14.4 Results and Discussion

After reviewing environmental concern and rhetorically asking whether this might not be a valuable way to approach the data set and the set of issues involved in this research, a number of post hoc questions were posed with respect to the data set to hand.

1.	What is the nature and magnitude of *environmental* concerns (using the developed taxonomy)?
2.	How consistent are people in their *environmental* concerns?
3.	What are the environmental-contextual and social-situational dimensions of *environmental* concern?
4.	Is it meaningful to talk about a level of *environmental* concern which combines all of the different concerns together?
5.	How are these concerns related to behaviour?
6.	How useful is this construct to environmental management?

Note: Question 5 and 6 will be addressed in Chapter 15 and 16.

For the sake of consistency and clarity of presentation, the overall result framework used in the previous two chapters has been adopted in this chapter. In addition, the above questions provide guidance for specific aspects of the organisation of the analysis and interpretation of results. Separate analyses were conducted for the four *environmental* concern domains: (1) *concern for the well being of cassowaries,* (2) *concern about economic, lifestyle, and psychological well being of self/others* in terms of this local issue, (3) *concern for the well being of the natural environment (general),* and (4) *concern about economic, lifestyle, and physical well being of self/others* in terms of general environmental issues. In addition, the empirical relationship between these domains were examined. The majority of tables and figures are illustrated in Appendix B.4.

14.4.1 Specific Ecocentric Concern:
Concern for the well being of cassowaries[1]

14.4.1.1 General Outline[2]

A high level of *concern for the well being of cassowaries* was not evident from the results[3], (mean ± SD = 50.01 ± 10.38). Rather, this concern level was within the medium high range (see Appendix B.4.11). However, a closer look at the concern dimensions indicates that the inclusion of an open-ended question to assess the need to protect cassowaries is perhaps not adequately and fairly assessing this notion. When this dimension is excluded, *concern for the well being of cassowaries* shifts into the high range. This latter calculation is employed when the two levels of concern, specific and general, are compared later in the analysis. The *value worth* dimension evidenced the highest mean score (standardised mean ± SD = 4.23 ± 0.7; Figure 14.1).

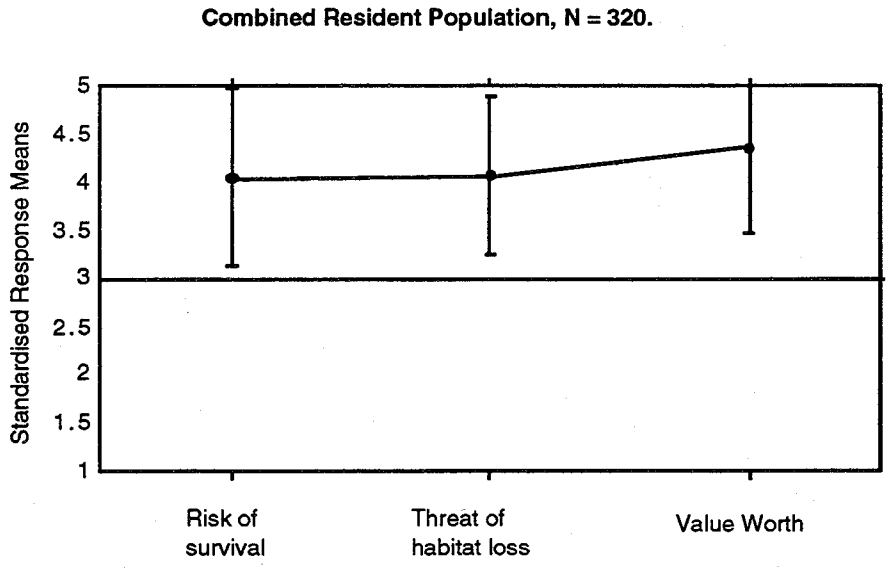

Figure 14.1 Level of *concern for the well being of cassowaries.*

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[1] Respondents' perceptions, representations, and understandings of this type of concern were examined using ten quantitative measures and four open-ended questions (see Appendix B.4.2 for the scale items).
[2] Items were coded such that a high score indicated a high concern level. For the ten 5-point Likert items which separated into the three sub-scales of *'concern for the well being of cassowaries'*, means, standardised response means, and standard deviations were calculated.
[3] For a high level of concern for a composite of 15 items the mean score would be in the range of 60 to 75.

For the open-ended question which asked respondents to identify the role of cassowaries in the ecosystem, 69.7% chose seed dispersal, reforestation/regeneration. Of these, 38.6% assigned this role as very important. This suggests a respondent population well aware of and acknowledging the *value worth* of this species in terms of ecosystem functioning. The importance of cassowaries as an indicator species of ecosystem health and species loss in general, is vividly illustrated in the following two comments,

> *I believe that the existence of cassowaries shows us that nature is still producing and if they disappear then all other facets of nature may follow in a slow extinction.*
> (semiurban resident, female, 42 years old)

> *Cassowaries are a critical emblem of soon-to-be-no-more animals.*
> (semiurban resident, male, 32 years)

Correlations between scale dimensions and composite concern score [4]
As expected, each dimension was significantly associated with the composite score, dimension-total intercorrelations ranged from 0.42 ($n=320$, $p < 0.001$) to 0.82 ($n = 320$, $p < 0.001$) (see Appendix B.4.12). In addition, numerous significant inter-dimension correlations were observed. Interestingly, belief that the *species should be protected* was not significantly correlated with *value worth of the species* . This suggests that beliefs regarding the need for action, such as protection, are independent of whether the species is valued in any particular way.

14.4.1.2 Environmental-Contextual Dimension of Responses

Resident Communities All resident communities scored within the medium high concern range (Appendix B.4.11). The highest level of the composite *concern for the well being of cassowaries* score was evident amongst the semiurban residents (mean ± SD = 53.1 ± 9.79), followed by the rural (mean ± SD = 50.06 ± 10.24), and urban residents (mean ± SD = 46.89 ± 10.12). A significant difference in this score was evident between the urban and the semiurban residents

[4] Ten 5-point Likert items and four open-ended questions were combined to form a composite *'concern for the well being of cassowaries'* score. Simple correlations between each of the scale dimensions and the composite score for the combined sample were calculated.

[F(2,317; n = 319)= 13.75, p = 0.0001; Fisher's PLSD; *F*max = 1.17] with semiurban residents significantly more likely to be concerned for the well being of cassowaries than the urban residents. This may well reflect the direct experience the different residents have with this species which will be analysed in the following section. For urban residents, cassowaries may not be a local, salient, or important enough issue since they are not part of their everyday life experience[5]. Other issues such as pollution, air quality, etc. may be more locally salient and hence important to them. This raises the question of 'specific' being equated with 'local' and 'general' being equated with 'global', and highlights the need exercise care when interpreting these levels of analysis.

The profiles of the resident communities varied according to *concern for the well being of cassowaries* dimensions. For three of the four dimensions, semiurban residents consistently scored higher (see Appendix B.4.11). The only sub-category for which there was no statistically significant difference between the communities was *perception of risk to survival of cassowaries,* with all resident communities perceiving this risk in a similar way. Interestingly, the resident community most responsible for directly contributing to habitat loss through land clearing - rural residents, and those indirectly contributing to habitat loss through their demands of residential land - semiurban residents, were not denying this type of human impact as an important threat to the survival of cassowaries. Despite this result, both communities may well be perceiving human impact in an 'abstract' rather than 'direct' way. Even though they attribute responsibility to humans in general, they still may not be linking their own behaviour to this impact. In contrast, urban residents were significantly less likely than semiurban residents to perceive habitat loss and hence human impact as a threat to cassowary survival [F(2,317; n = 319) = 15.32, p = 0.0001; Fisher's PLSD; *F*max = 1.85]. They and rural residents were also significantly less likely than semiurban residents to voluntarily express that cassowaries should be protected [F(2,317; n = 319) = 4.33, p = 0.014; Fisher's PLSD; *F*max = 2.6]. In an open-ended question, of the 26.7% of respondents reporting that cassowaries should be protected, 10.5% were urban residents, 15.2% semiurban residents, and 1.3% rural residents. A significant difference was also evident in how the resident communities perceived the *value worth* of cassowaries; urban residents considering the species to be of less value than the other two communities [F(2,317; n = 319) = 16.59, p = 0.0001; Fisher's PLSD; *F*max = 1.28]. Again this lower level of concern amongst the urban residents may well be reflecting the lower salience of cassowaries consistent with a lack of regular contact with the species.

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[5] The absence of cassowaries in the surrounding environment was one criterion which distinguished urban residents from rural and semiurban residents. Thirty (21.7%) urban respondents had seen cassowaries within a year of the survey compared to 35 (100%) and 134 (94%) of rural and semiurban respondents respectively.

Experience with cassowaries The composite *concern for the well being of cassowaries* index was significantly different according to the **direct** experience residents had with cassowaries in the wild [t (315, n = 317) = 3.202, p = 0.0015]. Of the concern dimensions, direct experience did not appear to significantly effect respondents' *perception of the risk.* However, it did appear to influence their *perception of threats* to cassowary survival [t (315, n = 317) = 3.124, p = 0.0019] and *value worth* of the species [t (315, n = 317) = 2.834, p = 0.0049]. *Concern for the well being of cassowaries* score was also significantly different according to respondents **repeated** experience with cassowaries [t (315, n = 317) = 3.01, p = 0.001]. Respondents who had either never seen a cassowary or who had only seen one once appeared to be less concerned than those who had seen them at least twice per year.

As with the results for *attitude toward cassowaries* (Chapter 12), these findings suggest that, in general, respondents who have a high degree of interaction with the natural environment (rural and semiurban residents) are subjected to direct and repeated experiences with inhabitants of that environment such as cassowaries. This, in turn, would appear to heighten their *concern for the well being of cassowaries*, particularly in terms of their perception of the threats of habitat loss and the value worth of the species.

14.4.1.3 Social-Situational Dimensions of Responses

Gender Females appeared to be significantly more *concerned for the well being of cassowaries* than males [t (318, n = 320) = 2.08, p = 0.0386]. The two dimensions of this scale for which they recorded significantly higher scores included *perception of threat of habitat loss* [t (318, n = 320) = -2.31, p = 0.0215], and *value worth of the species* [t (318, n = 320) = -2.03, p = 0.0435]. This finding suggests that both females and males were perceiving the risk to the survival of cassowaries in a similar way. The gender difference associated with *perception of threat of habitat loss* is consistent with the findings of Mohai's (1992) study. Although the target species of his concern item was not the same, the topic was. He found females to be significantly more concerned about the seriousness of loss of wildlife habitat than males.

Age No significant relationship was found between the composite *concern for the well being of cassowaries* score and age [r (n = 317) = 0.12]. Ten year cohort analysis, however, revealed a steady increase in the composite *concern for the well being of cassowaries,* from a low in the 16 to 20 age group (mean ± SD = 46.82 ± 9.41; n = 49), to a peak in the 45 to 54 age group (mean ± SD = 52.64 ± 10.23;

n = 65), followed by a decline in the > 65 age group (mean ± SD = 49.76 ± 11.36, n = 38).

Education Significant differences were evidenced between education levels for the composite *concern for the well being of cassowaries* score [F(3,313; n = 316) = 6.06, p = 0.0005; Fisher's PLSD; *F*max = 1.27] with TAFE educated respondents significantly more concerned for the well being of cassowaries than all other education groups (see Appendix B.4.13). Scores on all dimensions of *concern for the well being of cassowaries* were also significantly different across education levels:

1. primary educated respondents had significantly lower scores than all other groups on *perception of risk of cassowary survival,*

[F(3,313; n = 316) = 6.37, p = 0.0003; Fisher's PLSD; *F*max = 1.80];

2. secondary and university educated respondents had significantly lower scores on *perception of threats that cause cassowary loss'* than TAFE educated respondents,

[F(3,313; n = 316) = 3.25, p = 0.0223; Fisher's PLSD; *F*max = 1.70];

3. primary and university educated respondents had significantly lower scores on the *value worth of cassowaries* than TAFE educated respondents,

[F(3,313; n = 316) = 3.89, p = 0.0094; Fisher's PLSD; *F*max = 1.07];

4. secondary educated respondents had significantly lower scores on *cassowaries should be protected* than TAFE and university educated respondents,

[F(3,313; n = 316) = 3.22, p = 0.0229; Fisher's PLSD; *F*max = 1.52].

For the composite score and its four dimensions, concern levels peaked with the TAFE educated respondents, but declined again among those with a university education. The university educated composite score was actually lower than that of the secondary educated respondents, though not significantly lower. These results suggest that even though the better educated respondents appear to be more concerned, this concern level is not necessarily linked to the highest level of education - university. This finding is consistent with *attitudes toward cassowaries* (Chapter 12).

Income The income group with the highest level of *concern for the well being of cassowaries* was that between $10,000 and $20,000[6] (see Appendix

[6] Forty percent of respondents with incomes below $20,000 (n = 34) recorded their occupation as retired/pensioner in an age range of 43 to 82 years.

B.4.14). This group was significantly more perceptive of threats to cassowaries than those with incomes between $30,000 and $40,000, and above $50,000 [F(5,286; n = 291) = 3.21, p = 0.0077; Fisher's PLSD; *F*max = 1.08], and considered cassowaries to have more *value worth* [F(5,286; n = 291) = 2.61, p = 0.0249; Fisher's PLSD; *F*max = 1.58]. For the remaining dimensions, responses were similar across all income groups.

Years of residence This socio-situational variable did not appear to be meaningfully associated with the composite *concern for the well being of cassowaries* [r (n = 316) = -0.01], nor with any of this scales' dimensions. This was also confirmed for short-term versus long-term residents[7].

Group membership Group membership did not appear to be meaningfully associated with the composite *concern for the well being of cassowaries* score [t (313, n = 315) = 0.595, p = 0.5528], nor with any concern dimensions. This lack of association was also extended to group type. *Concern for the well being of cassowaries* appeared to be no further influenced by membership of a conservation group.

Taken together, these results suggest that a very high level of public *concern for the well being of cassowaries* does not currently exist. However, a medium high concern level is fairly widespread across the respondent population. Of particular interest were the effects of education, gender, residence and income. The picture which emerges suggests that primary educated male urban residents with family incomes between $30,000 and $40,000 were least concerned for the well being of cassowaries. On the other hand, female TAFE educated respondents living in Mission Beach, with a family income of between $10,000 and $20,000, appear to be the individuals most concerned for the well being of cassowaries. This may well coincide with the demographics of active participants of the local cassowary conservation organisation centred in Mission Beach. The inability of the measure of perceived risk of the survival of cassowaries to discriminate groups would suggest that this is a fact now broadly accepted though still not at a high enough level to promote an overall high level of public *concern for the well being of cassowaries*. Given the many other concerns in people's lives, it may be unrealistic to expect very high levels of concern. Furthermore, social desirability may be inflating reported concern levels.

[7] This relates to McBeth and Foster's (1994) rural social theory.

14.4.2 Specific-Egoistic/Anthropocentric Concern:

Concern about the economic, lifestyle, and psychological well being of self and other[8]

14.4.2.1 General Outline

Level of *concern about economic and lifestyle costs* as a consequence of conserving cassowaries was found to be in the medium low range (Table 14.3). This is an interesting result for environmental managers and requires a closer look at the item "I would accept any restrictions on land use due to cassowaries". The mean would suggest that respondents are 'only just' prepared to accept this (mean ± SD = 3.12 ±1.31, n = 320).

Table 14.3 Mean (± SD) responses for *concern about economic and lifestyle costs.*

Items	Mean	± SD
Concern about the economic and lifestyle costs		
1. If given the choice of conserving cassowaries and raising our standard of living, I would choose to raise our standard of living	2.54	1.3
2. I would accept any restrictions on land use due to cassowaries.	3.12	1.31
Concern about psychological well being		
Please specify the nature and intensity of your feeling for cassowaries by using the items and scales below		
1. sad.....happy	3.83	1.01
2. distressed.....pleased	3.91	0.98
3. dislike.....like	4.29	0.05
4. indifferent.....fascinated	3.89	1.11
5. nothing special.....privileged	3.97	1.04
6. bored.....excited	3.84	0.95
7. Cassowaries symbolise to me the beauty of nature.	4.16	1.01

[8] Respondents' perceptions, representations, and understandings of this category of concern were examined using nine quantitative measures: two 5-point Likert items measured *concern about the economic and lifestyle costs* and seven 5-point items measure *concern about psychological well being* (see Appendix B.4.5 for details).

Frequency distribution results, however, indicated that 43.3% of the respondents "moderately agreed" or "strongly agreed" with this item. Nevertheless, there were still a large percentage of respondents (37.9%) who disagreed with this item. The results also suggested that respondent's psychological well being was perceived to benefit in some way from the existence of cassowaries, with the loss of this species representing a psychological loss for these respondents (Figure 14.2).

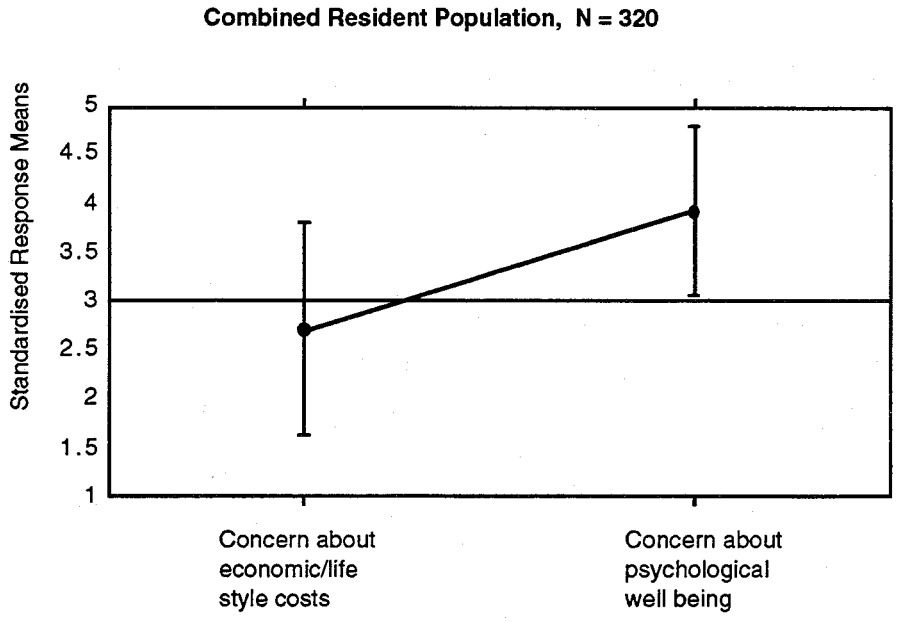

Figure 14.2 Levels of *concern for the economic, lifestyle, and psychological well being of self and others.* (one standard deviation error bars)

Comments provided by respondents to open-ended questions would seem to support this, as the following examples illustrate:

I get a good feeling from seeing cassowaries that lasts all day.

I am very grateful that they come and visit me.

I feel honoured to live in the same area as cassowaries.

I get a lovely sense of satisfaction when I see them.

As expected, *concern about economic and lifestyle costs* was significantly and negatively correlated with *concern about psychological well being* [r (n = 320) = -0.33, p < 0.05]. In the item-item intercorrelations, those who considered cassowaries to symbolise the beauty of nature were more likely to accept restrictions on land use due to cassowaries [r (n = 320) = -0.26, p < 0.05].

14.4.2.2 Environmental-Contextual Dimensions of Responses

Resident Communities The highest level of *concern about economic and lifestyle costs* was evident in the rural resident community (mean ± SD = 5.57 ± 2.63; n = 32), which, after all, is the community most likely to be affected by any restrictions or regulations on land use (Appendix B.4.15). Nevertheless, no significant differences were found between the communities. Because the issue of restrictions on land use due to cassowaries is an important management consideration, particularly in the rural sector, a closer inspection was made of this item. Of the three resident communities, the rural residents were disagreeing with restrictions (mean ± SD = 2.91 ± 1.52; n = 32). Surprising, however, was the finding that less than fifty percent of these residents were disagreeing (45.7%). An agreement response of 34.3%, together with those who were undecided, suggests the majority of rural residents do not disagree with this conservation strategy outright.

Urban residents were significantly less concerned for their *psychological well being* due to cassowaries than the semiurban and rural residents [F(2,317; n = 319) = 33.50, p = 0.0001; Fisher's PLSD; *F*max = 1.84]. As with the value worth of the species results, this may reflect the direct experience factor and local nature of this issue. Since cassowaries are not part of the everyday life experience of the urban residents, they may not be a visible enough issue to impact on their psychological well being.

Experience with Cassowaries Experience with cassowaries was significantly different according to just one of these anthropocentric concerns, *concern for one's own sense of well being,* with **repeated** experience [t (316, n = 318) = 8.91; p = 0.0001] heightening this concern level. It would appear that the experience must occur more than once for this concern level to be heightened.

14.4.2.3 Social-Situational Dimensions of Responses

Gender There were significant differences according to gender for both anthropocentric concern scores. Females appeared to be significantly less concerned about standard of living and restriction costs than males [t (318, n = 320) = 2.55, p = 0.0111], and significantly more concerned about their psychological well being [t (318, n = 320) = -2.68, p = 0.0078].

Age A significant relationship was not found between *concern about economic and lifestyle costs* and age [r (n = 317) = 0.08]. On the other hand, older residents were significantly more concerned *about psychological well being* [r (n = 317) = 0.28, p < 0.01].

Education No significant differences were evident between education levels for *concern about economic and lifestyle costs* (Appendix B.4.16). On the other hand, university educated respondents were significantly less concerned about psychological well being than secondary and TAFE educated respondents [F(3,314; n = 317) = 8.84, p = 0.0001; Fisher's PLSD; *F*max = 1.43].

Income All respondents with incomes below $30,000 appeared to be more concerned about their *psychological well being* than those with incomes $30,000 and above [F(5,286; n = 291) = 4.61, p = 0.0005; Fisher's PLSD; *F*max = 1.68; Appendix B.4.17].

Years of Residence This socio-demographic variable was not significantly associated with either of these two concern score.

Group Membership Group membership did not differentiate between respondents for *concern for economic/ lifestyle well being* [t (2,314; n = 316) = 0.663, p = 0.5078], or *concern for psychological well being* [t (2,314; n = 316) = 1.465, p = 0.144]. Type of group membership also failed to differentiate between respondents for both anthropocentric concerns. Conservation group members appear to have similar anthropocentric concern levels.

In summary, male respondents were more likely to be concerned about lowering standards of living and restrictions on land use as a consequence of conserving cassowaries; younger, university-educated urban males with high incomes were the least likely to be concerned about their psychological well being as a consequence of the extinction of cassowaries. Differences between the urban residents and those from the

semiurban and rural areas in terms of psychological well being once again raises the issue of the potential importance of direct experience with the target of concern in terms of concern levels (Eagly & Chaiken, 1993).

14.4.3 General Ecocentric Concern: *Concern about the well being of the natural environment*[9]

14.4.3.1 General Outline

Level of public *concern for the well being of the natural environment* was in the high range[10] (mean ± SD = 28.10 ± 4.87) with the awareness of *value worth* dimension evidencing the highest mean score (mean ± SD = 4.43 ± 0.75; Figure 14.3, Appendix B 4.18).

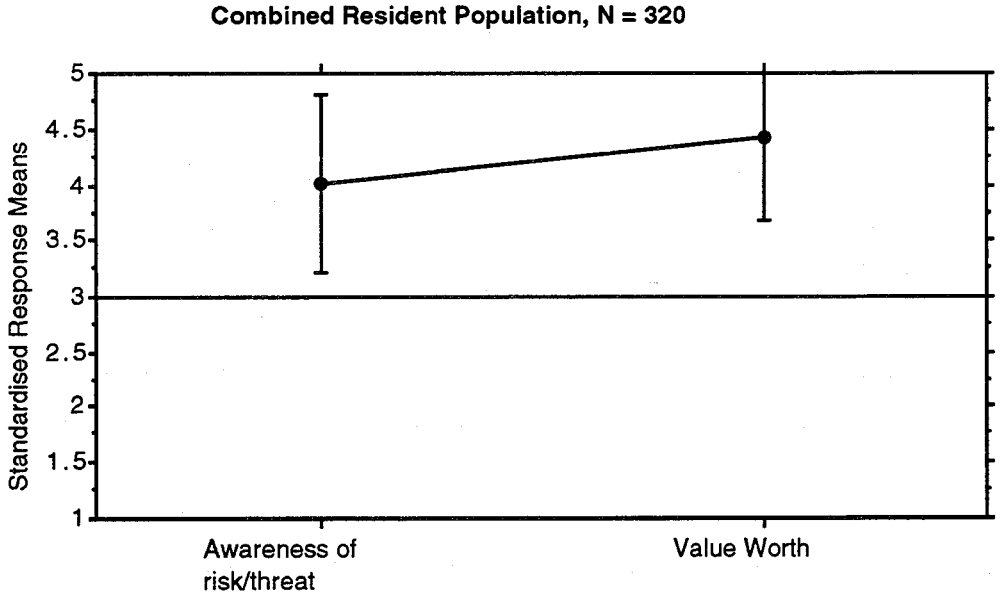

Figure 14.3 Levels of concern as measured by *awareness of risk/threat* and *value worth.*

[9] This concern category was examined using six quantitative items and one open-ended question (see Appendix B.4.7 for details). Items were coded such that a high score indicated a high concern level. For the six 5-point Likert items which divided into two categories of *concern for the well being of the natural environment,* response means, standardised response means, and standard deviations were calculated.

[10] A high level of concern for a composite of seven items would be in the range of 28 to 35.

14.4.3.2 Environmental-Contextual Dimension of Responses

Resident Communities Despite the higher urban resident concern score, the difference between resident groups was not significant (Appendix B.4.18).

14.4.3.3 Social-Situational Dimensions of Responses

Gender Although females scored higher for the total *concern for the well being of the natural environment* score and its two dimensions, a significant difference was only evident for the dimension *awareness of risk/threat to natural environment* [t (318, n = 320) = -2.01, p = 0.045]. Females were more aware and concerned about pollution, species loss in general, and hence the effects of human impact, than males. Their level of concern for all three scores was within the high range. These results are consistent with Mohai's (1992) suggestion that women express more concern than men to local environmental issues and that the difference is smaller for national issues. However, Davidson and Freudenburg's (1996) review of the literature suggests otherwise. In the 38 studies they reviewed, specificity of site or issue did not differentiate between the level of concern females expressed.

Age *Concern for the well being of the natural environment* was widespread across all age classes. This composite score and its dimensions were also not significantly related to age.

Education A significant difference was evident between education levels for *concern for the well being of the natural environment* [F(3,313; n = 316) = 3.71, p = 0.012; Fisher's PLSD; *F*max = 1.87; Appendix B.4.19). TAFE educated respondents appeared to be significantly more concerned for the well being of the natural environment and aware of risks/threats than those with a lower education [F(3,313; n = 316) = 3.09, p = 0.0274; Fisher's PLSD; *F*max = 1.72]. University and TAFE educated respondents appeared to be significantly more aware of the value worth of the environment than the lower educated respondents [F(3,313; n = 316) = 3.83, p = 0.0101; Fisher's PLSD; *F*max = 1.30].

Income No significant difference was evident between income level for *concern for the well being of the natural environment* (see Appendix B.4.20). The income group with the lowest level of *awareness of the value worth* was the poorest, below $10,000.

Years of residence A significant relationship was not found between this variable and the composite concern score[r (n = 316) = -0.07]. Nor did one exist with the two sub-scales.

Group Membership Once again group membership factors failed to differentiate between respondent scores.

An interesting finding was the similarity of the two levels of the composite concern scores - specific *concern for the well being of cassowaries* and general *concern for the well being of the natural environment.* Respondents as a whole appeared to be equally concerned for the well being of the natural environment as they were for cassowaries. This result is consistent with many responses to open-ended questions where respondents volunteered comments such as :

> *Cassowaries are no different to any other animal. All should be given equal attention.*
>
> *Cassowaries mean no more than any other animal.*
>
> *I love all native animals of Australia, not one in particular*
>
> *Cassowaries are worth as much consideration as any other species.*

14.4.4 General Egoistic/anthropocentric Concern: *Concern about the physical, economic, and lifestyle well being*[11]

14.4.4.1 General Outline

Awareness of negative impact of environmental degradation on physical well being to self/others evidenced the highest mean score, followed by *support for property rights* , *right to modify the environment* , and *awareness of the consequences of implementing environmental protection* (Figure 14.4, Appendix B.4.21).

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[11] The perceptions and representations of this type of concern are examined using eleven quantitative items (see Appendix B.4.9. for details of items). Items were coded such that a high score indicated a high concern level. For the eleven 5-point Likert items which separated into the four sub-categories of *concern about physical, economic, lifestyle well being* in the exploratory factor analysis, standardised response means were calculated.

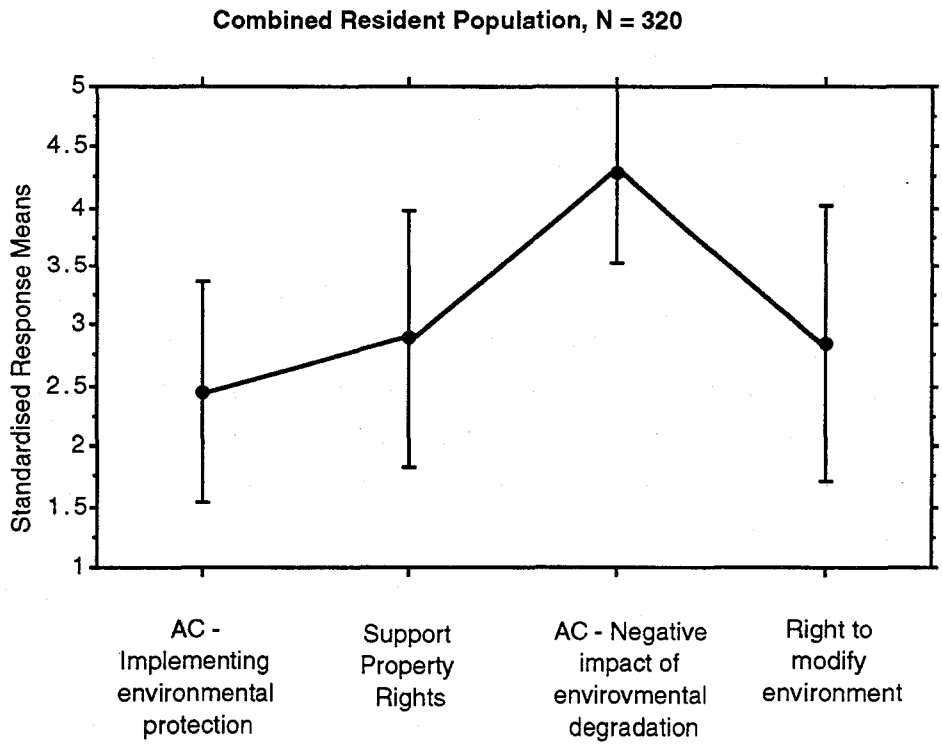

Figure 14.4 Levels of *concern about physical, economic, lifestyle costs to self/others.*

14.4.4.2 Environmental-Contextual Dimension of Responses

Resident Communities The responses of the resident communities varied for the dimensions of this concern scale (Appendix B.4.21). For three dimensions there was no significant difference between the communities, *ac - negative impact of environmental degradation* and *right to modify the environment*, with all resident groups perceiving these in a similar way. However, a significant difference was evident in resident communities' *support for property rights* with urban residents being less supportive than the other two groups [$F(2,317; n = 319) = 6.99$, $p = 0.0011$; Fisher's PLSD; $F_{max} = 1.48$].

14.4.4.3 Social -Situational Dimensions of Responses

Gender Females were significantly less concerned about costs associated with implementing environmental protection than males [t (318, n = 320) = 2.89, p = 0.0041], and significantly more aware of consequences of environmental degradation to the physical well being of self and others [t (318, n = 320) = -2.07, p = 0.0394]. These results are consistent with those of Stern et al. (1993), who developed the majority of items used in these two measures. Baldassare and Katz (1992), in their study of the perception of personal threat from environmental problems such as pollution, also found females to be significantly more likely to perceive environmental problems as a threat to physical well being. Females were also less likely to support modification of the environment [t (318, n = 320) = 2.15, p = 0.0326]. In summary, not only are females more likely to be aware of and concerned about the consequences of environmental degradation, they are also more supportive of efforts to conserve the environment, such as restriction on land use.

Age Age was not significantly related to any of these concern categories. The lack of an effect of age would suggest that concerns about economic and lifestyle well being are a consideration for all age groups, as is concern for one's physical well being. Contrary to these results, Baldassare and Katz (1992) found young adults to be more likely to express serious worries about the personal threat of environmental problems.

Education Significant differences were apparent between education levels for two categories of *concern about physical, economic, and lifestyle* (general environment) (see Appendix B.4.22). Both primary and secondary educated respondents were significantly more likely to support property rights than those with higher education [F(3,314; n = 317) = 8.99, p = 0.0001; Fisher's PLSD; *F*max = 2.2]. Interestingly, all groups appeared to be significantly less aware of the consequences of environmental degradation on physical well being than TAFE educated respondents [F(3,314; n = 317) = 5.99, p = 0.0006; Fisher's PLSD; *F*max = 1.25].

Income No significant difference was evident between income levels for any of the concerns about physical, economic, and lifestyle costs (see Appendix B.4.23).

Years of residence and Group Membership were not meaningfully associated with any of these general anthropocentric concern scales.

14.4.5 Relationships between *Concern for the well being of cassowaries* and the 'other' environmental concerns.

14.4.5.1 Correlation Analysis

Specific egoistic/anthropocentric concern For *concern for the well being of cassowaries* there was a strong negative correlation with respondents' concern about restrictions and regulations on behalf of cassowaries and a strong positive correlation with respondents' awareness of the benefits of cassowaries to their psychological well being (Table 14.4). This finding suggests that respondents who are most concerned for the well being of cassowaries are most willing to accept the limitations of restrictions and regulations as a consequence of protecting this endangered species. They are also very concerned about their own psychological well being.

Table 14.4 Correlations between *concern for the well being of cassowaries* and other *environmental* concerns.

	SPECIFIC ECOCENTRIC CONCERN: *'Concern for the well being of cassowaries'*				
	TOTAL concern for the well being of cassowaries	perception of risk of cassowary survival	perception of threats to cassowary survival	need of action-protection	value worth of cassowaries
Specific egoistic / anthropocentric concern					
concern about economic, lifestyle well being	-0.49 ***	-0.48 ***	-0.38 ***		-0.35 **
concern about psychological well being	0.58 ***	0.34 **	0.45 ***		0.54 ***
General ecocentric concern	0.48 ***	0.51 ***	0.45 ***		-.29 **
awareness of risk/threats to natural environment	0.40 ***	0.52 ***	0.43 ***		
awareness of value worth of natural environment	0.35 ***	0.29 **	0.27 **		0.28 **
General egoistic / anthropocentric concern					
awareness of consequences of implementing protection	-0.31 **	-0.38 ***	-0.25 *		
support for property rights	-0.31 **	-0.43 ***	-0.31 **		
right to modify the environment	-0.25 *	-0.28 **	-0.23 *		
aware of negative impact of environmental degradation on physical well being	0.36 ***	0.39 ***	0.31 **		0.24 *

Note: * = **Significant at 0.05;** ** = **Significant at 0.01;**
**** = **Significant at 0.001**

(1) Only significant correlations included.

General ecocentric concern Respondents concerned about cassowaries were also concerned about the natural environment.

General egoistic/anthropocentric concern Three of the four dimensions of this environmental concern domain were significantly and negatively correlated with *concern for the well being of cassowaries.* Respondents who were concerned for cassowaries were less likely to be concerned about the consequences of protecting the environment, less supportive of property rights, less likely to modify the environment, and were far more aware of the negative impact of environmental degradation on their own and others' physical well being (Table 14.4).

As the intercorrelations among some scales were high, one could argue that they partly measure general environmental concern and not specific topics. A factor analysis of all 37 items was performed to examine this possibility. The results confirmed the specific - general distinction in level of analysis. All items addressing the specific issue of cassowaries loaded on factors separate from those which addressed general environmental issues. Any overlap which did occur was confined to these analysis level domains. Two factors, *perceptions of risk* and *perception of threats to cassowaries* loaded on one factor. The *value worth* of cassowaries for its own sake and for the sake of the psychological well being of self and others also loaded on one factor. As indicated earlier, separation between the two was expected to be difficult. Nevertheless, all original dimensions of *concern for the well being of cassowaries* were retained as distinct entities for descriptive purposes, emphasising their conceptually unique content. These findings also suggest that the assumption implicit in previous studies about the unidimensionality of environmental concern is unwarranted and misleading. Research with this North Queensland community sample found environmental concern to contain at least eight dimensions.

14.4.5.2 Multiple Regression Analysis

A simultaneous multiple regression procedure was employed to assess the unique variance explained in *concern for the well being of cassowaries* by each of the eight predictor variables making up the specific anthropocentric concern scale, and the two general ecocentric and anthropocentric concern scales. Despite all of the predictor variables being significantly correlated at the univariate level, only four of the eight variables remained significant in the reduced multivariate model: the two cassowary-specific anthropocentric concerns -*concern for economic/lifestyle well being* $\beta = -0.20$ ($p < 0.0001$), and *concern for psychological well being* $\beta = 0.46$ ($p < 0.0001$); one general

ecocentric variable $\beta = 0.22$ ($p < 0.0001$); and one general anthropocentric variable $\beta = -0.12$ ($p < 0.0001$). The most parsimonious model, accounting for 46% of explained variance, included the two specific anthropocentric concern variables *concern for economic/lifestyle well being* and *concern for psychological well being,* yielding statistically significant standardised beta coefficients of $\beta = -0.33$ ($p < 0.0001$) and $\beta = 0.49$ ($p < 0.0001$), with *concern for psychological well being* accounting for the highest amount of explained variance (partial $F = 121.19$). This result suggests that distinguishing between the specific anthropocentric concerns in predicting *concern for the well being of cassowaries* is valuable. In addition, *awareness of the value worth of the natural environment* and for *concern for private property rights* accounted for significant portions of explained variance, though not as important as the two specific anthropocentric concern variables. Interestingly, while *awareness of risk/threats to natural environment* and *awareness of negative impact of environmental degradation on physical well being* were highly correlated with *concern for the well being of cassowaries* at the univariate level, when analysed within the multivariate procedure, their utility as predictors became non significant.

14.5 Summary and Conclusion

Drawing on both the insights and shortcomings identified in the literature on environmental concern, the approach developed in this chapter was primarily an attempt to provide an alternate framework for exploring the human component of the ecosystem and in turn offer an additional opportunity for broadening our understanding of the human-natural environment interface. The emphasis on the need for conceptual and operational clarity, as suggested by this study as well as many other previous studies, highlighted the theoretical and practical importance of a clearly defined concept in any environmental research endeavour.

In this study, the encompassing conceptual model of environmental concern situated specific domains of concern and highlighted relevant conceptual variables. In the primary classification of environmental concern two distinguishable components were identified. The first, the ecocentric/biocentric component, emphasised concern for the environment for its "own sake". The second, the anthropocentric / egoistic / socioaltrustic component, emphasised concern about the effects of the environment on the "self" and "others". This ecocentric-anthropocentric distinction provides an important mechanism for assessing individual and community support for action and environmentally responsible behaviour

with ecocentric concern identifying a prerequisite precursor to support and behaviour, and anthropocentric/egoistic concern identifying both the "barriers" to and "motivators" of that support and behaviour.

In addition, the specific-general distinction suggests that there are differing debates and concerns within the community. A measure of what is considered a general concern to one group may be tapping responses to many different specific and even unrelated issues for another group (Wall, 1995). The findings of this study are consistent with Reser et al's (1996) argument that such a classification reflects the reality that environmental concern can refer to a number of domains of concern which are not all directly about natural environmental degradation, but are implicated in terms of individual and community response to perceived ecosystem problems.

14.5.1 Nature and Magnitude of Environmental Concerns

14.5.1.1 Cassowary-Specific Concerns

Concern for the well being of cassowaries has emerged as a significant issue for this North Queensland population sample. In this study, respondents' considered appraisal of the specific environmental threat/crisis, the possible extinction of cassowaries, appears to closely align with the judgement of "experts" - the natural scientists' classification of cassowaries as **endangered** (Nature Conservation Act, 1994). The findings suggest that respondents are well aware that this threat is real, that the survival of cassowaries is at risk, and that humans are in some way responsible, with habitat loss being accepted as the major cause of this species' decline. In combination with the high value worth assigned to cassowaries, these findings have produced a medium-high level of concern for their well being(Figure 14.1). This would signify that, to the public, an environmental crisis currently exists - all is not well for this species. As with the biological indicators of this crisis (Chapter 6 and 9), the endangerment of cassowaries as perceived by the public constitutes an additional dramatic indicator of a dysfunctional system. After all, without this perceived concern for the well being of cassowaries there would be no crisis, since finally such a crisis is a matter of human analysis and appraisal (Machlis, 1992; Reser et al., 1996).

Recognising that a problem exists and that human behaviour is primarily responsible for environmental degradation is a critical precursor to behaviour change (Stern et al., 1992a, 1992b). Therefore, an awareness that the survival of cassowaries is at stake and that this is a case for collective responsibility if not personal responsibility, as evident in this

study, is a significant finding. Because the attribution of responsibility places a moral obligation on the person by establishing liability for resolving environmental problems (Hallman & Wandersman, 1992; Stern 1992), this outcome has potentially important implications for increasing public support for action and behaviour change. Being aware that certain actions have consequences for the welfare of the environment and accepting personal responsibility for these actions, draws upon the social psychological research on prosocial behaviour - the theory of activation of moral norms developed by Schwartz (see for example, Stern et al., 1993). Under the two conditions outlined, Stern et al. (1993) argue that, " individuals experience a sense of moral obligation to prevent or mitigate harmful consequences. This so-called personal norm motivates action" (p.324). The expectation, therefore, is that the concern these respondents have expressed for the well being of cassowaries may well have important positive consequences for the future of this species. Nevertheless, such concern needs to be channelled, validated, informed, etc. It is, therefore, a necessary but not sufficient condition.

One possible explanation for the magnitude of this concern is the emergence of an environmental ethic, a new way of thinking about the environment in the form of norms governing the relationship of humans to the natural environment (Heberlein, 1972; Stern et al., 1993). It is now well-documented that a general environmental consciousness has grown and become widespread (Dunlap & Mertig, 1992; Milbrath, 1985; Pepper, 1996; Stern et al., 1992). However, Dunlap and Van Liere (1977) suggest that in the early stages of problem identification, public recognition of the problem is inclined to receive increasing attention from larger and larger segments of the public. The outcome is that such concern tends to peak quickly but is then followed by a rapid decline as the "crisis matures", because of growth in opposition to proposed solutions and a rise in the belief that the problem/crisis is being solved. The magnitude of the concern level evidenced in this study may therefore be associated with the relatively early stages which public recognition of the problem of cassowary survival was in at the time of the survey and that no restrictions or regulations had been proposed or at least implemented to protect this species [12].

In accepting the traditional social science approach to concern, which recognises that the concern people express for the natural environment is in part because they see the human environment as being simultaneously threatened as a consequence of the state of the natural environment (e.g., Baldassare & Katz, 1992), concern about one's own

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[12] Although concern for cassowaries first captured public and management agency attention in 1986 following the devastating impact of Cyclone Winifred along the North Queensland coast, the first formalised cassowary specific conservation efforts did not take place until 1991, only three years prior to this community survey.

psychological well being as a consequence of the loss of cassowaries presents an alternate explanation to that offered by Heberlein - the emergence of an environmental ethic. Reser et al. (1996) have used the notion of 'motivation' to explain the role of this type of anthropocentric concern in respondents' level of support for action which may well be extended to their concern for the well being of cassowaries. The findings support this explanation, with concern about one's own psychological health having a significant influence on concern for cassowaries (Table 14.4). This alternate view is also consistent with Dunlap and Van Liere's (1977) argument in response to Heberlein's (1972) optimism for the emergence of an environmental ethic. Dunlap and Van Liere suggest that community changes in support of environmental quality "probably stem more from traditional moral precepts (e.g., respect for the welfare of fellow humans) than from the emergence of an environmental ethic" (p.203), a notion developed further by Stern et al. (e.g., 1993, 1994). Dunlap and Van Liere's concluding comments with regard to concern about oneself have significant implications for environmental management, "we are faced with the ironic prospect that the natural environment may ultimately benefit more from human's concern for their fellow human beings (and themselves) than from their concern for the nonhuman world" (1977, p.206).

In terms of concern about one's own economic and lifestyle well being, the findings suggest that as yet such concern is not evident, with respondents supporting (moderately) the possibility of restrictions on land use and a lowered standard of living due to cassowaries, at least at this point in time (Figure 14.2). The negative bivariate and multivariate association between concern for cassowaries and the anthropocentric concerns which deal with economic and lifestyle consequences of protecting cassowaries (restrictions, regulations, property rights) (Table 14.4; Section 14.4.5.2), reflects a potential "barrier" for the translation of ecocentric concern to support for action and behaviour (Buttel & Flinn, 1977; Reser et al., 1996).

This concern for the well being of cassowaries for their "own sake" appears to be influenced by a number of these anthropocentric environmental concerns. For example, the potential threat from the economic or lifestyle repercussions of environmental reform can be a powerful determinant of this ecocentric cassowary concern level (Table 14.4; Section 14.4.5.2). Furthermore, because respondents most concerned about their own economic/lifestyle well being appear to be either unaware of or unwilling to acknowledge that the survival of the cassowary is "at risk", to be unaccepting of any human responsibility in the decline of the species, and to consider that cassowaries are of limited value, they may well reflect a respondent group dependent on a utilitarian mode of production (Buttel & Flinn, 1977). Such concerns have important implications for environmental management.

14.5.1.2 Natural Environment Concerns

The pattern of responses for this general measure of environmental concern paralleled that for cassowaries in that respondents were similarly concerned for the well being of cassowaries as they were for "other" environmental issues (Figure 14.3). In as much as these two measures of concern can be compared, this would suggest that the survival of cassowaries is either no more salient an issue to be concerned about than "other" environmental issues, or that concern about cassowaries encapsulates and distils more general concerns in a particularly salient and poignant way. While the comment volunteered by a 45 year old, female, semiurban resident supports the former explanation, *"Cassowaries are no different to any other animal. All should be given equal attention"*, it also says something about the perceived critical and all-consequential status of the whole ecosystem and that it is the whole rather than just a specific part that the public perceives to be in crisis. Such findings support the proposition that ecocentric environmental concern, regardless of how it is measured - specific or general - is widespread (Wall, 1995).

14.5.2 Individual and Community Differences in *Environmental* Concern

Differences in the nature and magnitude of cassowary-specific concerns were apparent in five environmental-contextual and social-situational factors explored: residence, experience, gender, education, and income. Perhaps the most interesting finding to emerge was that of little support for the long standing assumption that environmental concerns were urban issues and that the specific community of residence, the rural community were less concerned than their urban counterparts (Kellert, 1996; Lowe & Pinhey, 1982; Van Liere & Dunlap, 1980).

In the context of this North Queensland population sample a closer look at the concern categories suggests that the lower urban (Townsville) concern scores was due in part to their lower level of awareness or at least acknowledgment that habitat loss and hence human impact on cassowaries threatens this species survival. In addition, the urban residents appeared to value cassowaries less and to be less concerned about their own psychological well being as a consequence of such loss. Because such a response pattern parallels that for direct and repeated experience (Section 14.3.1.2), this may partially explain the difference between the lower urban and the higher semiurban (Mission Beach) and rural (Granadilla) residents concern levels. The urban residents' lack of direct and repeated experience with cassowaries, which would leave them to appraise the situation indirectly rather than directly, may result in their consideration of this species as less

salient. Alternatively, the direct and repeated experience the rural and semiurban residents have of cassowaries may well be shaping their concern for this species. This is consistent with Van Liere and Dunlap's (1981) comments that environmental problems mean different things to different people. A measure of what is considered a general concern to one group may be tapping responses to many different specific and even unrelated issues for another group (Wall, 1995). For the urban residents, cassowaries are perhaps not a salient enough local issue for them to place a higher value worth on the species. Instead, issues such as pollution and air quality may be more salient and more local. The similarity in resident community response to the items which tap concern about the economic/lifestyle well being was surprising, considering that rural residents are more likely to be affected by restrictions on land use.

The gender difference apparent across all of the cassowary-specific concerns is also noteworthy since this is the first time gender has emerged as a significant factor in any of the analyses so far. The findings suggest that in this North Queensland population sample females are more concerned for the well being of cassowaries than males. They appear more prepared to acknowledge habitat loss as the major threat and hence accept at least collective responsibility. They appear to value the species more, to be more concerned about their own psychological well being as a consequence of the loss of the species, and they appear less concerned about their own economic/lifestyle well being as a result of protecting cassowaries. Gender differences were not found, however, for perception of risk. These findings are consistent with previous research (e.g., Mohai, 1992; Stern et al., 1993), and support some common themes developed in ecofeminist literature, such as the women-nature cultural connection (e.g., Griffin, 1978). However, Jackson (1993) argues that ecofeminist discourses ignore the notion that "masculinity and femineity are rational, socially constructed, culturally specific and negotiated categories" (p.125). Stern et al. (1993) suggest shared experiences rather than innate differences as more likely to cause gender differences with regard to humanistic or biospheric altruism. In their research they use the following argument from feminist theory to explain their findings, "women tend to see a world of inherent interconnections, whereas men tend to see a world of clearly separate subjects and objects, with events abstracted from their contexts" (p.340).

The interesting aspect of education level variation in responses is that the findings do not support previous research which suggest that concern levels increase with an increase in education level (e.g., Buttel & Flinn, 1978; Dunlap & Van Liere, 1980), or that education level remains unrelated (e.g., Baldassare & Katz, 1992).

Chapter 15

An Account of the Human Component of the Ecosystem

15.1 Introduction

The view that emerged early on in this study was that rather than focusing on a single theoretical framework, variable or methodology, there was a need to explore multiple perspectives of relevance to the dimensions under study in order to discover psychological and situational processes and interdependencies that might not be evident from a single perspective. It is clear from the extensive literature reviews and analyses of the preceding chapters that no one discipline, theory, or concept holds the answers to complex questions in environmental research. *Understanding* humans and human systems has been shown in this research to encompass many theories, concepts, domains, and subject areas, each characterised by a diversity of academic and folk understandings, and processes that contribute to these understandings.

While a particular focus on one discipline, one level of analysis and one analytical construct is at times necessary and beneficial, such shifting foci can lose sight of the holistic quality of person-environment relations and prove very limiting to the pragmatic needs of environmental management. Nevertheless, while there is a strong emphasis on building integrative models (Stern, 1992), this research has chosen theoretical and

methodological pluralism as the most appropriate strategy for a multidisciplinary and more pragmatically focused dissertation.

15.1.1 Chapter Outline

Since the focus of this research has primarily been on three different ways in which individuals and communities evaluate, represent, and understand various characteristics of the natural environment they interact with, this chapter attempts to *assemble* and *integrate* the collective theoretical and empirical findings which derive from these ways of framing the human component of the ecosystem. This begins with an analysis of the links between each of the psychosocial domains and actual environmental *activity*. Throughout this study, theory, measurement, research, results and the practical utility of various ways of researching individual and community representations and understandings of the natural environment and endangered species have been discussed in detail. In addition, an attempt has been made to keep in mind the interrelationships among the various approaches. The objective of this next section of the chapter is to try and answer the question, "What do these 'accounts' tell us?" by drawing on unifying key themes that have emerged from the empirical analyses, and to discuss these in the context of various theoretical frameworks from environmental and social psychology, sociology, and environmental management. An overview of the current research findings in light of their contribution to theoretical advancement is presented in the fourth section of the chapter. The concluding section offers some comments on the limitations of the research as well as recommendations for future research.

15.2 Environmental Activity

This summary consideration investigates how the different psychological and other social science orientations toward environmental issues explored in the preceding chapters are linked to environmental actual *activity*, thus completing an empirical analysis going from measures to consequences. The degree of covariation with or prediction of environmental *activity* involving all of these psychological components is the focus of this chapter. So far the purpose of exploring what people knew about environmental issues, and how they perceived and evaluated, represented and understood them, assumed priority attention. The reasons for this were many.

Firstly, the emphasis on explanation was seen as an important starting point, with such investigations identifying people's connections with the natural environment through their attitudinal positions towards both specific and general environmental issues, their information base, and their readiness to behave in ways to safeguard and improve environmental conditions. Such information was considered particularly valuable to the process of developing and implementing policies and programs aimed at preventing the extinction of a species and the degradation of the natural environment.

Secondly, it was recognised that not all respondents had the opportunity to engage in activities specifically aimed at alleviating threats to cassowaries. For example, other than financially supporting a cassowary-specific conservation group (which they may well be unaware of), urban respondents would have had little opportunity to engage in such activities. In addition, many respondents believed the activities associated with cassowary conservation involved either participation in a particular group or at least direction from that group; this perception, in the Mission Beach community, was probably associated with a reluctance to become involved in cassowary-specific activity. Some examples of responses to the following open-ended question illustrate the general aversion respondents had to involvement in group activity.

If you have **not** engaged in any activities that might alleviate the threats to cassowaries, could you please explain why not?

> *(I) consider that a large proportion of the money spent on cassowary conservation is wasted on some people's feelings about them. If everyone was steered in a constructive direction there would be more chance of being directly involved."*
>
> (60 year old, male, university educated, semiurban resident).

> *We don't join in on community activities but we do try and look after any cassowaries that may be around our property."*
>
> (34 year old, female, high school educated, rural resident).

> *The executive committee of the cassowary conservation group is too self interest oriented. If there was a balanced committee, I would be involved. They have too much money, power, and ego."*
>
> (34 year old, male, TAFE educated, semiurban resident).

The cassowary conservation group is a select group of people making a living out of the existence of these fine animals and absorbing large amounts of tax payers monies while enjoying their hobby."

(43 year old, male, high school educated, rural resident.)

Such responses highlight the difficulty involved in adequately assessing individual-oriented cassowary-specific activity and the embeddedness of both attitudes and activities in the social and political contexts of community life, particularly when a conservation issue is a salient, emotionally charged and divisive community issue. These responses also suggest methodological problems associated with the question posed, a shortcoming of the survey instrument.

Thirdly, while behaviour is in some ways the 'acid test' of environmental consciousness, it is clear that a survey such as the one employed is unlikely to capture much of the real dynamic and interdependencies between mediating and moderating variables and processes, on the one hand, and overt behaviour on the other. To think that a community survey can readily sample, distil, and explicate such nested individual and community processes has been a classic and naive misconception of many management agencies and social scientists. Rather, such surveys tell us how multiple factors and variables covary, in reasonably crude terms and across time, situations and respondents. The behaviour 'measured' in such surveys is typically self-report and retrospective. It is necessarily verbal behaviour about reconstructed events and actions. This is not to criticise surveys and social science research which are invaluable as well as expedient. Rather, it is important to be clear that the type of research is <u>not</u> participant observation or ethological research; it does not typically involve the observation and monitoring in situ of overt behaviour or situational contingencies. In this respect such research is very different from the cassowary field study of Section 2.

Notwithstanding these limitations, the decision was made to not undertake an observational, ethological study of human behaviour as this could not really be accomplished within the study circumstances and time constraints of the dissertation. As well, such data gathering was hard to justify in terms of a cost/benefits analysis, whereas the survey methodology allowed for a more surgical data collection that, in effect, allowed for hundreds of respondents to be their own observers. The real world context of this research also required a methodology that could be employed by managers and environmental organisations to practically measure and monitor human behaviour; there is no contest between community survey and participant observation in terms of time,

energy, funding and range of critical behaviours covered. In addition, what is often most critical about human behaviour relates to psychological factors and subjective representations of the world which are not accessible by biological field study methods. 'Behaviour' can and does include intraindividual behavioural processes - thinking and feeling, appraising and worrying, recalling and planning. Structured interviews and surveys can explore all of these behaviours, as well as overt actions. All such data, however, are necessarily mediated through reconstructions, reflections and self report (Nisbett & Wilson, 1977). Hence the endeavour is really an assessment and explanation of *perceptions* and *representations* of activities in the real world.

With the emphasis throughout this study on same level of specificity/generality in measurement, a second important methodological consideration was that measures of cassowary-specific activity could only be assessed for rural and semiurban residents, since these were the residents most likely to be involved in such species-specific activity. Therefore, it was to these residents that cassowary-specific activity questions were directed.

The third methodological consideration was to clearly define the indicators of environmental activity used in this study. With the main emphasis on predicting the likelihood of respondents supporting strategies aimed at protecting the environment, the *intention* to accept economic and general lifestyle restrictions or regulations was consider a valid indicator of environmental activity. A measure of *prior* engagement in any activity oriented toward alleviating environmental threats was used as a second indicator of environmental activity.

A fourth factor considered critical for attitude / information / concern - activity consistency again involved analytical specificity (Eagly & Chaiken, 1993). For example, cassowary-specific measures of attitude / information / concern were used as the predictor variables for cassowary-specific indicators of environmental activity, and general measures were used only for the general indicator of environmental activity. Although not entirely satisfactory, these measures together provided some idea of the nature and magnitude of covariation that could be expected with respect to the domains of attitudes, information base, belief systems and value orientations, environmental concerns and environmental activity.

15.2.1 A Specific Issue: Cassowaries

15.2.1.1 Correlation Analysis

To identify and explore links between the cassowary-specific measures of environmental activity (intention to accept/support and prior environmental activity) and attitudes toward cassowaries and concern for cassowaries, an initial, overall intercorrelation matrix was used (Appendix B.5.1). Examining the correlation matrix presented in Appendix B.5.1, it is clear that the strongest correlations found were those between *intention to accept/support* and emotion, and *prior activity* and concern for the well being of cassowaries and total attitude score. In addition, attitude, information, and two environmental concern scores were significantly and positively correlated with both environmental activity indices. Concern for economic/lifestyle well being was also significantly and negatively correlated with *prior activity*.

15.2.1.2 Multiple Regression Analyses

This data set was also analysed using multiple regression in order to look at how the different predictors (independent variables) predict the two environmental activity indices. A multiple regression was performed for each index. In the first regression analysis, *intention to accept/support* was most strongly predicted by respondents' emotional connection with cassowaries ($\beta = 0.39$, $p = 0.003$), their concern for their well being ($\beta = 0.24$, $p = 0.003$), their beliefs about cassowaries ($\beta = 0.22$, $p = 0.001$), and finally, the level of their information on this species ($\beta = 0.14$, $p = 0.04$) (see Appendix B.5.2.). In this analysis a significant amount of variance was explained for *intention to accept/support* ($r^2 = 0.40$), primarily due to its association with emotional connection with cassowaries. Despite the significant correlation between *intention to accept/support* and concern for one's own psychological well being, the nonsignificant beta coefficient indicates that the effect of this anthropocentric concern on *intention to accept/support* was reduced in this regression analysis.

In the second regression analysis, *prior environmental activity* was also significantly predicted by respondents' emotional connection with cassowaries ($\beta = 0.35$, $p = 0.02$), their concern for the well being of cassowaries ($\beta = 0.19$, $p = 0.04$), concern for their own psychological well being ($\beta = 0.26$, $p = 0.05$), and the level of their information on this species ($\beta = 0.25$, $p = 0.0007$) (Appendix B.5.2.).

Findings from these regression analyses highlight the importance of emotion as a strong predictor of both environmental activity indices. This is evidence for the idea that emotion is implicated as an important variable in the processes which lead from perception and appraisal to behaviour. It also flags emotion as an important and accessible measure which taps into important dimensions of community attitudes and perceptions, such as involvement, commitment, conflict, and concern, and which can also predict behaviour.

15.2.2 A General Issue: "Other" Wildlife and Environmental Issues

15.2.2.1 Correlation Analysis

Statistically significant measures of association from the correlation analysis are presented in Appendix B.5.3. It is important to keep in mind that the two principle indicators of environmental activity relevant to "other" wildlife and environmental issues were correlated (Pearson's r is 0.38, $p < 0.0001$), again suggesting a moderate significant relationship between intention to accept/support and prior environmental activity.

For these general environmental activity indicators, the pattern of association differed across a number of variables. *Intention to accept/support* was significantly correlated with fifteen of the twenty-three variables: four attitude and five *environmental* concern scores, two DSP dimensions, total DSP score, and three NEP dimensions. On the other hand, prior environmental activity was significantly correlated with just eleven variables: two attitude scores, the information score, two *environmental* concern scores, five DSP scores, and one NEP score (Appendix B.5.3).

15.2.2.2 Multiple Regression Analysis

In the regression analysis which included all twenty-three variables, only four survived as significant predictors of *intention to accept/support*, and three were identified as significant predictors of *prior environmental activity* (Appendix B.5.4).

In the first regression analysis, in which the principle predictors accounted for 31% of the variance, *intention to accept/support* was most strongly predicted by the cognitive component of attitudes ($\beta = 0.27$, $p = 0.001$), concern about one's own physical well being ($\beta = 0.16$, $p = 0.04$), concern about the protection strategies ($\beta = -0.23$, $p = 0.002$), and private property rights ($\beta = -0.19$, $p = 0.01$). In the second regression analysis in which the principle predictors accounted for 23% of the variance, *prior environmental*

activity was most strongly predicted by concern for the well being of the environment ($\beta = 0.24$, $p = 0.002$), concern about protection strategies ($\beta = -0.23$, $p = 0.004$), and economic growth ($\beta = -0.31$, $p = 0.0001$).

Both of these regression analyses highlight the importance of the environmental concern measures as predictor variables. In addition, these findings support the notion that the motives underlying environmental activity are important indicator factors (Thompson & Barton, 1994). Ecocentrism and anthropocentrism both act as significant predictors of the indicators of environmental activity. Anthropocentrism (concern about self or others), for example, appears to influence a respondent's *intention* to participate in various types of environmental action in both a positive and negative way. In the above example, being concerned about the consequences of pollution on one's own physical well being tends to motivate one to at least *intend* to act, whereas concern about environmental protection strategies and the rights of private property owners has the reverse effect. On the other hand, both ecocentric and anthropocentric motives significantly affect *prior environmental activity*. That is, respondents who are concerned for the well being of the environment for its own sake (ecocentrics) tend to participate in environmental activity, whereas respondents who are concerned about the consequences of environmental protection strategies on their own economic and lifestyle well being and who are supportive of economic growth, tend to remain detached from such activity. The fact that concern for physical well being dropped to non significance in this regression model is inconsistent with Baldassare and Katz's (1992) findings, which indicated such concern to be a strong predictor of adopting environmental practices. The progressive loss of shared variance in multiple regression may, of course, partially account for this.

Overall these findings are consistent with those of Thompson and Barton (1994), who also found that their measures of ecocentrism and anthropocentrism made independent contributions to 'conserving behaviours'. Perhaps the most important outcome here is that these findings point to the significance of both ecocentric and anthropocentric motives in assessing individual and community representations and understandings of the natural environment and environmental activity, and therefore underscore the care that is needed in measuring such constructs.

15.3 Assembling and Integrating Findings

In developing this account for *understanding* humans and human systems in the context of the human-natural environment interface, there has been a reliance on theoretical and methodological perspectives from environmental and social psychology, which have been modelled on both "natural science" and "human science". These included the interactional and transactional theories of *person x environment* (Chapter 10, Section 10.3) and the environmental and social psychological concept of *multiple levels of organisation / integration* and *explanation* (Chapter 11, Section 11.2). The two general theoretical and analytical frameworks, together with specific theoretical constructs (attitudes, belief systems and value orientations, environmental concerns, and environmental activity), and the pragmatic needs of environmental management, have provided the theoretical and applied foundations for this study.

The use of a multifaceted investigation was considered most appropriate for dealing with a research problem that obviously involved complex levels of organisation in everyday life situations where controls were impossible to achieve and when the focus was on explanation rather than prediction alone. Although many may consider such an approach too broad, the following caution of Proshansky (1990) validates the need for such investigations.

> If environmental psychologists succumb to the aura of "respectable science" methodology that has borrowed so heavily and indiscriminately from the physical and natural sciences, their efforts will bear little fruit in understanding how humans interact with their environment. I hope they can resist the temptation. (p.29)

Out of the assemblage and integration of the theoretical frameworks proposed, and the findings of this study, a more holistic account of the human component of the ecosystem has evolved. From the theoretical and empirical analyses outlined in the preceding chapters, a number of key aspects of the human-natural environment interface have emerged which provide the unifying theme in the following discussion.

15.3.1 Key Psychosocial Aspects Of the Human-Natural Environment Interface

15.3.1.1 The Pro-Environmental Stance

In focusing on individual and community representations and understandings of the natural environment, special attention was given to the importance of the actual evaluations and appraisals that individuals and communities made concerning natural environmental issues. Despite their predominantly descriptive nature, the findings offer two important perspectives. The first involves differences in degrees of "readiness to safeguard" the environment, respectively evidenced by the pro and con positions taken by respondents to cassowaries and 'other' environmental issues. The second more focused perspective identifies areas of variation by highlighting "points of tension", "sources of opposition", and "areas of neutrality"[1], all of which can lead to deterring, mediating, or at least subduing public motivation.

A readiness to safeguard the environment The findings in all three analyses of the human component of the ecosystem suggest that a widespread pro-environmental stance characterises this North Queensland population sample. For example, in the attitude analysis, the majority of respondents expressed a positive evaluation of cassowaries and 'other' wildlife (Figures 12.3 and 12.7). In their evaluation of abstract environmental concepts (Chapter 13) as opposed to specific entities (Chapter 12), respondents strongly endorsed the pro-environmental world view (Figure 13.5). The high scores for concern for the well being of cassowaries and the natural environment further confirmed the pro-environmental position taken by this North Queensland population sample (Figures 14.2 and 14.4). Finally, in a self-evaluation measure, 68% of respondents considered themselves to be fairly strong environmentalists. If, as Buttel (1992) suggests, "environmentalism is what its bearers say it is", than this self-evaluation and the measures of an pro-environmental stance are closely aligned.

The general implication of this pro-environmental position is that there appears to be a "readiness" (Milbrath, 1985) among respondents to safeguard the environment in general, and cassowaries in particular. Some political scientists and sociologists would speculate that this readiness is indicative of a profound transformation in the relationship between humans and the environment which began with the environmental movement of the 1960s

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[1] Areas of 'neutrality' refers to the interpretation of mid-scale responses (e.g. scores around 3 on the 5-point Likert scale.

and 1970s (Cotgrove, 1982; Milbrath, 1984, 1985; O'Riordan, 1976).

However, a "readiness to safeguard", which in psychological theory implies 'motivation' (Eagly & Chaiken, 1993), does not simply reflect motivation to act (see Bragg, 1996). Rather, in the context of this research, a "readiness to safeguard" more importantly implies the willingness to accept and/or agree to management strategies aimed at preventing the extinction of a species and/or the degradation of an environment. As such it is an indicator of support, support that in the case of an endangered species is a critical component of any recovery effort (Wondolleck et al., 1994).

Points of tension In the search for evidence of common denominators, the above discussion has highlighted the presence of a pro-environmental stance across this population sample. However, like all social behaviour, the public's position on the environment is manifold in kinds and degree. So, in taking such a broad perspective, although it is valuable in providing a broad picture, there are limitations particularly in terms of potentially concealing the heterogenous nature of responses. With the need to reveal areas of variation in order to unravel the clues about process and cause, a closer look at the psychological components revealed some interesting findings.

A readiness to safeguard the environment, though widespread across the respondents of this research, was not simply leading to the unconditional support for management strategies. Instead, tensions between the need to conserve and the need to exploit emerged. While the findings suggest that many respondents potentially could be supportive of management strategies (as indicated by their pro-environmental stance), this support was conditional as evident by their hostility to government interference in general and the support they express for economic growth (Figure 13.2). Such tension is apparently not uncommon (Dunlap & Van Liere, 1984; Milbrath, 1985; O'Riordan, 1976a, 1977). In fact, it is consistent with the view that a duality in anthropocentric and ecocentric modes occurs in most of us and that such coexistence does not necessarily produce compromise (O'Riordan, 1976; Rokeach, 1976a). Many respondents in this research in fact think of themselves as environmentalists, and present an overall pro-environmental stance. However, at the same time they are concerned with government interference and their own economic and lifestyle well being (Figure 13.2). Obviously the transition from an anthropocentric to an ecocentric view of the natural environment is not complete in this population sample, nor perhaps is it ever likely to be (O'Riordan, 1976a; Shabecoff, 1993). The ambiguity that characterises this population sample's relationship to the natural environment is consistent with numerous studies on this topic (see Milbrath, 1985 for review) and with the notion that behaviour is a complex product

of multiple concerns and continually shifting needs and priorities. Concerns about environmental issues must compete with many other day to day issues and world events.

Sources of opposition In addition to these points of tension, the findings also suggest that important "sources of opposition" or "barriers" to a pro-environmental stance in this North Queensland population sample include issues of private property rights, economic growth and material abundance (Figure 13.2). According to Kraan (1995), these issues are closely entwined, with the concept of "property rights" in economic literature being taken as "a subjective right with respect to an economic good" (p.167). A possible explanation for private property rights being a factor that competes with the pro-environmental stance is one which is grounded in the libertarian theory of property since this is the theory of justification of property rights most closely linked to the "values of species and environments" being "less fundamental than the property rights of the owner" (Dodds, 1994, p.55).

This traditional libertarian justification places an emphasis on the individual owner's right to exercise all the rights of ownership. Such rights entail no obligation of the landowner to leave the land in a nondegraded or useable state when disposed of. In addition, the only limits on such rights is the violation of others' rights and the onus is on this second party to establish that violation has occurred. This may not necessarily lead to restrictions but to compensation only. Private property rights therefore raises some very important issues with regard to rights, power, duties, responsibilities, equity, and justice encompassing individual and collective aspirations. As described by environmental researchers and theorists (e.g., Beatley, 1994; Bennett et al., 1995; Dodds, 1994; Kellert, 1996; Seabrook & Pickering, 1994), the debate about land use and the environment is essentially a debate about property rights.

It would appear that property rights most frequently provide a mechanism which enables landowners to exercise their ingenuity and inclination to exploit the natural environment (Seabrook & Pickering, 1994), a privilege now being challenged by may who dispute this interpretation of such a right. Dodds (1994) outlines the legal and moral underpinnings of different theories of property rights, suggesting that there are alternate views to the traditional libertarian justification, a theory "which leaves little room for regulation of property rights on environmental grounds". She concludes:

> In Western liberal democracies landowners have been, historically, thought of as exercising a kind of sovereign control over their land. Any encroachment of the owner's property right was seen to threaten the very foundations of political order. No authority could legitimately restrict owners' rights to do as they pleased with

> their land. This attitude towards property rights and land ownership was grounded in the values of the liberal theory of property which was dominant from the eighteenth century. Although legal regulation and limitation of property rights over land has increased greatly over the past fifty years, the attitudes of the past have often remained. By recognising the ways in which such values are found in particular theories of the justification of property rights, we can challenge those attitudes towards nature and property which contribute to the degradation of our environment. Further, by understanding the relationships between the range of values protected by different theories of property and the different values we place on the environment, we can begin to argue clearly and sensitively for change in our property institutions. (p.58)

While this issue of property rights is being challenged, it, together with economic growth and material abundance, provides important clues to opposition to a pro-environmental stance and environmental activity in this North Queensland population sample.

Areas of 'neutrality' Areas of 'neutrality' in survey research, which are the mid-scale responses, have been linked to two opposing interpretations: indifference versus ignorance (Grichting, 1994). Indifference which implies apathy is considered to represent those who do not care about an issue - they lack knowledge, interest or emotional investment. On the other hand, ignorance implies ambivalence, with respondents being unable to make up their mind, presumably because they see two sides of an argument. According to Milbrath (1985) this indicates inner conflict. The alternative perspective is that we are dealing with both an artifact from measuring procedure and the condensing of complex attitudinal position into a single-item scale. Following Milbrath's view, the empirical evidence from Grichting's research, and the strong cognitive and emotional investment evident in the findings from this research, the mid-scale ratings can be reasonably interpreted as indicators of both ignorance and inner conflict.

The most interesting 'neutral' findings that may well reflect inner conflict amongst this North Queensland population sample are those of the conative component of both attitudes toward cassowaries (Figure 12.3) and other wildlife (Figure 12.7). These findings suggest that the inability to forgo benefits to oneself for the sake of the natural environment causes inner conflict for these respondents because, in general, it is inconsistent with their pro-environmental stance.

15.3.1.2 Emotional Connections to the Natural Environment

A more specific topic that emerges as a key unifying theme in this research is emotion, the affective component of evaluation and appraisal. While emotion is more typically considered in terms of the evaluative processes involved in individual and community responses to the natural environment, of interest here is simply the existence and magnitude of an emotional connection to the natural environment and its association with other modes of individual and community response.

Varying magnitudes of emotional attachment were found in most of the emotion-related individual and community responses explored in this study. For example, emotional connections that extend beyond just being neutral or indifferent were evident in both the attitude (Sections 12.5.1.1 and 12.5.2.1), and the environmental concern analyses (Section 14.6.2.1).

Biophilia and Biophobia One explanation proposed for the emotional attachment to the environment is linked to Wilson's (1984) "biophilia hypothesis". Wilson defines biophilia as "the innately emotional affiliation of human beings to other living organisms" (p.31). Such a concept has drawn many supportive as well as critical comments (see for example, Kellert & Wilson, 1993; Soulé, 1993), re-igniting the debate between the Neo-Darwinian or genetic basis for human affinities and reactions to nature, and explanations that are "nondeterministic, nonbiological, concerned with culture, social equity, and justice, and often influenced by Marxist thought" (Soulé, 1993, p.442). Soulé (1993) considers such mutually exclusive views to be unproductive, pointing out that a strict adherence to them rather than a joining of ideas is based on ideology being more precious than knowledge. However, there are those who disregard this strict dichotomy of explanations and instead define biophilia simply as human affinity for other species regardless of whether learned or innate (e.g., Diamond, 1993).

In the attitude analyses, respondents from this North Queensland population sample exhibited many positive emotional responses to animals - responses such as love, fascination, excitement, privilege (Sections 12.5.1.1 and 12.5.2.1). However, in contrast to the strong positive response to 'loving' animals in general, a negative emotional response, or 'biophobia' (Wilson, 1993), was found in the context of 'fear'. This fear was of snakes which apparently is not uncommon amongst people in industrialised societies (Diamond, 1993; Shepard, 1996; Ulrich, 1993). Both Diamond (1993) explains this fear as part of a learning process, "In nonforaging societies it doesn't make sense for people to waste time learning to distinguish snake species; ... [that is the dangerous from the nondangerous] ... its better to learn as babies from their

parents' frightened responses as generalized fear of snakes to be passed on in turn to their children" (p.266). Ulrich, on the other hand, suggests that humans are partly genetically predisposed to biophobia and as such will respond in a fearfully or adverse way to certain living things. Apart from this example of biophobia, no other instances were evident in the collective responses in this study. Nevertheless, examples of negative emotions did exist in a number of individual responses. Seven respondents (2.2%), for example, indicated a *dislike* for cassowaries, and twenty-three (7%) indicated being *unhappy* with cassowaries.

These examples of both positive and negative emotional attachments to the natural environment support the view of Sagan and Margulis (1993):

> ... there is no simple biophilia, no unconditional, unchanging love for members of other species", rather, "the emotional palette of our responses to life-forms is rich, labile, and complex" ... "With such complexities, such an admixture of feelings both positive and negative, and subtle states in between ... it is difficult to speak monolithically of biophilia, a simple love of life. "p.346, 347)

Such a diversity in responses highlights the need to not ignore heterogeneity "because any variation in responses can provide clues about mechanisms and causes" (Soulé, 1993).

Mobilisation of mental and behavioural activity Whether innate or learned, or a combination of both, emotional attachment to the natural environment offers a number of interesting perspectives on possible functions in one's mental and behavioural relationship with the environment. According to the functionalist approach to attitudes (Section 12.2.1.2) and hence to emotions (Eagly & Chaiken, 1993; Lazarus, 1991; and readings in Pratkanis et al., 1989), emotions may play an important motivational role particularly in terms of mobilising both mental and behavioural activity.

The relationships which emerge in this study between emotional connections to the natural environment and, for example, the general pro-environmental stance advocated by the new environmental paradigm (Section 13.5.2.2) and concern for the well being of cassowaries and other wildlife (Sections 14.6.1.2 and 14.6.3.2), suggest that certain general needs or motives may in fact be strengthening and directing emotions of the respondents from this North Queensland population sample. Emotional connection to cassowaries was strongly related to environmental activity (Section 15.2.1). Bragg (1995), in her research in North Queensland, also found emotional connection to the natural environment to be consistently related to environmentally responsible behaviour.

The notion of mobilising a certain mental and/or behavioural response is explained by Lazarus (1991) in his proposed motivational principle, "emotions, once generated, involve a compelling urge toward action, ... whether this action is conceived as an innate feature of emotion or as a coping strategy that is sensitive to and shaped by the adaptational requirements of the person-environment relationship" (p.97). However, Bragg (1995) suggests that, in terms of increasing environmental activity, it doesn't matter why people feel emotionally connected to the natural environment, but simply that they feel a connection.

The other interesting debate concerning emotion is the interplay of emotion and cognition. The implication of many theoretical treatments is that emotion is postcognitive (Edwards, 1990). However, Ittelson et al. (1974) view it differently. They consider the first level of response to the environment to be affective and that such a response may govern the directions that subsequent relations with the environment will take. Whether it is innate or learned, of motivational consequence or not, post or pre cognitive, this study suggests that emotional attachment to the natural environment and particularly cassowaries is real and important. This has many consequences and implications in terms of the measurement and "management" of community perceptions, responses, and behaviour. Equally, if not more important, is the fact that the degradation of this environment and/or the loss of cassowaries could diminish the environmental quality and lives of residents, Australians, and humans generally in many important ways.

15.3.2 Key Sociodemographic Aspects of Human-Natural Environment Interactions

In continuing the exploration of the psychological processes involved in individual and community representations and understandings of the natural environment, a number of key sociodemographic aspects emerged. Rather than revisiting discussions outlined in the preceding chapters, the emphasis here is on pulling together unifying themes that have evolved out of these analyses. For example, in bringing together the findings on the resident communities, questions are raised about the traditional assumptions of conservative, anti-environment rural communities in opposition to pro-environment urban communities. Similarly, findings involving education level question the assumptions of previous research and conventional wisdom relating to links between high education and a high pro-environment stance. Finally, a key issue to emerge from the findings is the apparent general aversion to group membership in this North Queensland population sample, particularly regarding conservation groups. This raises questions about the

almost exclusive focus on group rather than individual approaches in collaborative models used in environmental management.

15.3.2.1 Residence

An interesting environmental-contextual factor which encompasses a number of physical as well as social characteristics of the environment is residential status. This variable was highlighted as of particular interest in this research not only to ensure a reasonable sampling of rural, semiurban and urban residents, but to explore whether such contextually and societally significant groupings would evidence distinctive representations and understandings of this particular North Queensland environment. As well as being relevant to the general understanding of human-natural environment interactions, this type of information was seen to be of particular relevance to environmental management.

The common belief that the farming or rural community is anti-environment in terms of being less concerned, less supportive of protection, etc., was not supported, at least in the context of the variables used in this study and the communities sampled. In fact, the rural residents in this North Queensland population sample (Grandilla) presented a very pro-environmental stance overall, consistent with the findings of Bragg (1996). They held very favourable attitudes toward cassowaries and 'other' wildlife, and particularly strong cognitive and emotional connections to these species (Figure 12.4). In addition, they were well-informed about all environmental issues (Figure 12.10), their commitment to the ecocentric value orientation of the new environmental paradigm was high (Section 12.5.3.2), as was their concern for the well being of cassowaries and 'other' environmental issues (Sections 14.6.1.2 and 14.6.3.3). The only component of the study for which these rural residents collectively provided some indication of either a neutral or negative environmental stance included their moderate endorsement of some of the anthropocentric value orientations of the dominant social paradigm (Figure 12.4).

In addition to the rural resident's overall pro-environmental stance, the findings did not support the traditional view on the rural/urban dichotomy which considers a pro-environmental stance or at least support for environmental protection to be the position taken by urban residents rather than rural residents. This view has been primarily based on "nature exploitive occupations" theory (Lowe & Pinhey, 1982), which maintains that rural resident's essentially utilitarian relationship with the natural environment, because of their involvement with extractive occupations such as farming, is more likely to produce representations and understandings of that environment that are either negative or at least

not as pro-environmental as urban residents (Kellert, 1996; Lowe & Pinhey, 1982; Van Liere & Dunlap, 1980). In this instance, residence becomes a proxy variable for extractive-nonextractive occupations (Van Liere & Dunlap, 1980). Tremblay and Dunlap (in Lowe & Pinhey, 1982) extend this notion of a negative or lowered pro-environmental stance to all rural residents whether engaged in nature-extractive occupations or not. This they based on the notion of early socialisation, which through a 'shared rural culture' produces 'shared beliefs, norms, and values'.

In contrast, this study found that, for many of the psychological variables, the rural (Granadilla) and urban (Townsville) residents from this North Queensland population sample held similar views. For example, both resident communities were equally intent to act supportively toward cassowaries (Section 12.5.1.2). In addition, they held similar views on the anthropocentric value orientations of the dominant social paradigm (Section 13.5.1.3), and endorsed the ecocentric value orientations of the new environmental paradigm (Section 13.5.2.3). For their environmental concern scores, there was no significant difference in concern for the well being of cassowaries (Section 14.6.1.2) and the environment (Section 14.6.3.3). More importantly, their concern about the economic and lifestyle costs associated with protecting the environment (Section 14.6.2.2 and 14.6.4.3) was similar.

In addition to these areas of similarity, for many other attitudinal considerations the differences between the rural and urban residents were in a direction opposite to that suggested by previous research (e.g., Kellert, 1996). For example, the rural residents held significantly higher positive evaluations of cassowaries than the urban residents, particularly in terms of their cognitive and affective connections (Figure 12.4). Their emotional connection to other wildlife was also significantly higher (Section 12.4.2.2), as was their information level (Figure 12.10).

These findings demonstrate that this rural community holds attitudes, beliefs, values and concerns about the natural environment that could potentially motivate them toward supporting protection of this environment and particularly cassowaries, rather than being opponents of conservation. Conclusions drawn from other research to the effect that rural communities are anti-environment are therefore both unfortunate and inaccurate with respect to this North Queensland population sample. Anti-environment rhetoric which rural residents as well as urban and semiurban residents at times express may well be linked to negative experience or negative stereotypes with respect to environmental groups, rather than to lack of support for protection strategies. This is highlighted in the following comment made by a sixty year old banana farmer, one not uncommon nor restricted to the farming community.

I enjoy the environment and wish to protect it but detest the environmental pressure groups because of their inflexibility.

The findings presented here reveal that a general pro-environmental stance occurs within a framework that is far removed from the simple dichotomy of anti-environmental rural and pro-environmental urban resident. There is presently a strong pro-environmental stance in the rural area explored in this study which obviously finds expression in the context of their lifestyle and their own experiences. This is remarkable considering the unfortunate history of development and environmental conflict that has plagued North Queensland; the Wet Tropics World Heritage Listing being most relevant to the rural community (see Section 11.3.1). This has left a legacy which makes the pro-environmental stance even more remarkable but also explains conflicted views. Buttel (1992) believes that such a stance would "need to be tied to social justice in order to be enduring" (p.16). A more adequate understanding of such contingencies is therefore a prerequisite to the development of any effective efforts to increase rural conservation activities.

15.3.2.2 The Social Environment

Education Education emerges as another key social-situational factor that provides an interesting insight into individual and community representations and understandings of the natural environment. Two key findings from this research are particularly relevant. The first is the consistent associations between education level and virtually all of the psychological variables explored in this study. The second is the discovery that education level is related to these variables in a very complex way, in many instances very different to what was expected.

The most common theme to emerge in the literature on the social determinants of environmental attitudes, knowledge, belief systems/value orientations, concerns, and behaviour, was the reliability of the social variable of education level (e.g., Buttel & Flinn, 1978). In the present study, education level consistently provided insights into variation in responses. However, unlike previous studies, an association between high education level and a high pro-environmental stance was not supported. Rather, the most consistent response pattern in this North Queensland population sample was that pro-environmental scores peaked for those with a TAFE education and declined with university-educated respondents. Furthermore, the highest (university) and lowest (primary) educated respondents were very similar in their responses to many issues - often being found to have the lowest scores. What appears to underlie this similarity in response is lower emotional affiliation with the environment. Primary and university

educated respondents had the weakest emotional connections to cassowaries (Section 12.5.1.2), which also extended to 'other' wildlife (Section 12.5.2.3). This lower emotional affiliation was also apparent in their consideration of the value worth they attributed to cassowaries (Section 14.6.1.4), and their concern for their own emotionally-oriented psychological well being should cassowaries become extinct (Section 14.6.2.1).

On the other hand, similarity in responses was not evident in the context of issues that involved a commitment to support protection, regulations and restrictions. Here there was evidence of a low/high education level dichotomy, with primary-educated respondents appearing to be very concerned about these issues whereas university-educated respondents evidenced a more supportive stance. TAFE and university-educated respondents gave the strongest support to accepting land use restrictions and lowered standards of living for the sake of cassowaries (Sections 12.5.1.3 and 14.6.2.3), and 'other' wildlife (Section 12.5.2.3). These respondents were also least supportive of many of the anthropocentric value orientations of the dominant social paradigm, in particular limiting government interference and supporting private property rights (Section 13.5.1.4). Finally, they were least concerned about the consequences to themselves of implementing environmental protection (Section 14.6.4.4). However, these are a group which may have less to lose from government interference, particularly in terms of restrictions and regulations on private property.

Given this evidence, there is a need to stress the importance of avoiding the too simplistic view that links high education with a high pro-environmental stance. Such a generalisation appears to be based on research that divides education into just two categories, low and high (e.g., Bragg, 1996), which has most likely masked the effects of a more precise categorisation. In addition, research in the past may well have failed to recognise the multifaceted nature of a "pro-environmental" stance. As evident from these findings, a much more complex situation arises when a more precise categorisation of education level and a diversity of measures of the pro-environmental stance are used. In summary, when emotional connection with the natural environment is the measure of interest, the low/high - anti-environment/pro-environment dichotomy does not seem to hold. However, when the relationship is measured according to issues of rights, restrictions, and regulations, this dichotomy appears. This would suggest that "framing" of environmental issues according to "emotional" feelings versus "rights, restrictions, regulations" is particularly important.

Group participation Issues relevant to group participation arose regularly and in various ways throughout this study. Since group participation is an issue that potentially has important implications for environmental management, a brief

summary of the findings relevant to the notion of 'group' involvement is offered, along with some possible explanations. Firstly, the findings suggest that across this North Queensland population sample there is a general aversion to groups or at least 'formal' group involvement. Sixty-seven percent of respondents had no affiliation to any group - community, business, service, conservation, etc. (Section 11.2.3.3). The reason for this general aversion to 'formal' group involvement is not clear. However, despite a general pro-environmental stance being taken by the majority of respondents (Section 15.3.1.1), and 68% of this survey population considering themselves as fairly strong environmentalists, antagonism toward conservation groups was evident. In addition, a considerable amount of information was provided to explain this antagonism. For some, this hostility was targeted at particular groups (Section 15.2), while others associated conservation groups in general with "radical greenies", "radical movement", "overpowering views", "black and white attitudes", "lack of fairness", "too hard line", "too rigid, "too much money, power, ego", "waste of time", "too much disagreement and arguments", "inflexible", to mention a few of the comments that respondents voluntarily added to the survey questionnaire. Overall, the comments suggest an underlying resentment of what respondents consider to be an unwillingness to compromise on the part of the conservation groups on the one hand and their ineffectiveness on the other. The interesting aspect of these findings is that in this instance group identification does not appear to function in the way proposed by Eagly and Chaiken (1993). That is, representing and understanding the environment in a similar way (personal experience) does not necessarily lead one to identify with an environmental group.

Another noteworthy finding that further questions the role of groups in providing a source of identity, information, and a forum for activity in the context of the environment is one that emphasises the importance of the individual. When asked to rate the importance of a variety of sources of information about the environment, wildlife and conservation issues, 70% of respondents considered their own personal experience as the most important. This compares with 63% - National Parks, 40% - Wet Tropics, and 38% - conservation groups. The importance of this personal experience was confirmed in the attitude and environmental concern analyses which clearly linked a high pro-environmental stance with personal and repeated experience (Sections 12.5.1.2 and 14.6.1.2). These findings therefore raise the question about an individualistic approach in conservation and management activity as opposed to or at least in addition to focusing only on group processes.

The pity is that groups can be powerful forces for changing opinion and sustaining and validating behaviour change. Group conflict, on the other hand, and polarised community opinion, can ensure that groups cannot serve this function and indeed that

additional conflict resolution interventions are necessary. In such a context individuals, class rooms, interpretation centres and educational campaigns are probably more effective strategies than the use of groups. Such an approach can 'sample' those features of the system that are most critical to monitoring, informed decision-making, and possible intervention. This makes for very efficient and purpose-driven methodologies which have considerable flexibility while allowing for both multidisciplinary and ecological integrity. Clearly this is what management requires and it is instructive that this is also what has been called for by biological and social scientists themselves in terms of better understanding and intervening in the system as a whole (e.g., Clark et al., 1994; Stern et al., 1992).

15.4 Concluding Comments

It may well be argued from the discussions presented thus far, that there are a number of quite distinct levels of explanation of the human-natural environment transactions. However, it is equally possible to argue that the different levels of analysis are inextricably linked, providing an holistic and 'ecological' account of the human component of the ecosystem. From the perspective of this study, the person x environment multi-level approach has been the most appropriate theoretical framework for exploring the complex and dynamic human-natural environment interaction. This approach allowed for the assembling of an holistic account of the human component of the ecosystem, providing simultaneous knowledge of separate psychological, physical and social constructs as well as a unified perspective.

In summary, an understanding of the dynamics of different psychological processes made possible a better understanding of the overall attitudinal, value and motivational basis of individual and community responses. On the other hand, the approach taken allowed for and explored the situational and cultural context of these community responses, including very salient rights and equity issues, as well as political and economic dimensions. The responses were simultaneously influenced by individual and shared psychological characteristics as well as environmental variables.

The framework has also helped to bridge the gap between approaches necessary for theoretical and knowledge advancement and those required for the pragmatic needs of environmental management. It has required the researcher to "step back" (Bragg, 1996) and take a holistic view of the human system while at the same time examining the underlying social psychological processes in a theoretical and analytical fashion. The

emphasis this approach places on multi-level and multi-construct analysis has also brought together several areas of social science, broadening the understanding of humans and human systems. And finally, this approach stresses the dynamics of the system with people and environments continuously reshaping each other.