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the International Park Strategic Partners Group

Healthy Parks Healthy People

The Health Benefits of Contact with Nature in a Park Context

An Annotated Bibliography

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Authors Ms Cecily Maller¹

Dr Mardie Townsend¹

Mr Peter Brown²

Associate Professor Lawrence St Leger¹

¹ School of Health Sciences, Faculty of Health & Behavioural Sciences, Deakin University

² The Lort Smith Animal Hospital, North Melbourne, Victoria

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Foreword

Parks Victoria has “Healthy Parks, Healthy People” as its key message to the community of Victoria. Likewise, many other park management agencies in Australia and worldwide are seeking to communicate a similar message. It is important that park management agencies improve their understanding of what this message means, and determine ways to communicate the importance of parks and nature to human health and wellbeing to the government and the community.

This annotated bibliography is part of a joint initiative between Parks Victoria, the International Park Strategic Partners Group, and Deakin University. All organisations recognise the significance of the health and wellbeing benefits from interacting with nature in park settings, the implications for public health, and the lack of collated information on this topic.

This document brings together significant research on the health benefits of interacting with nature, not previously compiled, to provide park managers with key references to guide decision-making, and future park planning. Criteria for inclusion included significance of the work, and relevance to either the health benefits of contact with nature or implications for park management and planning. Funding was provided by the International Park Strategic Partners Group.

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Introduction

The idea that nature is good for human health and wellbeing is the subject of research in diverse scientific disciplines including psychology, environmental health, psychiatry, biology, ecology, landscape preferences, horticulture, leisure and recreation, wilderness and of course public health policy and medicine. Driving these divergent streams is the central notion that interacting with nature is beneficial, most likely essential, to human health, wellbeing and quality of life.

Despite the level of active research in this area, little of this information is available to park managers and other decision makers who plan and manage the most significant areas of nature available in cities and rural areas, namely parks.

Major findings so far have documented an enormous range of potential health and wellbeing benefits from contact with nature, including crime reduction, fostering psychological wellbeing, reducing stress, boosting immunity, enhancing productivity, promoting healing in psychiatric and other patients, reducing blood pressure, heart rate and cholesterol, and fostering spiritual development, among many others. Based on this evidence, parks and nature have enormous health potential that is currently under-utilised. This is chiefly due to the recent emergence of empirical data in this area, and the lack of dissemination of information.

When parks were first designed in the nineteenth century, city officials had a strong belief in the possible health advantages that would result from open space (Rohde & Kendle, 1997). It was hoped that parks would reduce disease, crime, and social unrest as well as providing “green lungs” for the city and areas for recreation (Rohde & Kendle, 1997). At this time, it was also believed that exposure to nature fostered psychological wellbeing, reduced the stresses associated with urban living and promoted physical health (Ulrich, 1993). These assumptions were used as justification for providing parks and other natural areas in cities, and preserving wilderness areas outside of cities for public use (Ulrich, 1993; Parsons, 1991).

Although parks have not entirely lost their connection with health, the modern emphasis is almost exclusively on their use as a venue for leisure and sport. The following body of literature demonstrates beyond doubt that parks provide many benefits to human health, wellbeing, and quality of life than many park management agencies, health professionals, members of the general community, and government departments are aware. It is hoped that this document will remedy the situation somewhat by providing a source of reference for those seeking to broaden their knowledge in this area.

The criteria for inclusion of references in this bibliography were:

- Significance — of findings (or theoretical framework) to the health benefits of contact with nature through parks;
- Scope — articles broad in scope were given a higher priority than those limited in scope;
- Quality of research — studies demonstrating empirical certainty were preferred over those where results were unclear (in categories where there is a larger body of work articles were scrutinised more closely than in those where little work is available); and
- Timeliness — recent papers were given a higher priority over older ones, except if they incorporate findings of significance, or demonstrated groundbreaking research.

The articles are grouped according to the following categories: parks, nature and health (including leisure, wilderness values, and general articles on parks, nature, and health); the health benefits of contact with nature (including viewing or being in nature, contact with plants and animals, and wilderness or adventure therapy); the human-nature relationship biophilia, ecopsychology and environmental psychology, human ecology and landscape preferences); and public health and nature (including an ecological theory of health, and social capital, the environment, and health). Sections of edited books or published conference proceedings have been entered individually according to the degree of relevance, or significance of the work. Some articles may be repeated if they have relevance to more than one category to cater for more flexibility of use.

Categories

Parks, Nature, & Health

Canadian Parks/Recreation Association. 1997. *The Benefits Catalogue*. Gloucester, ON: Canadian Parks/Recreation Association.

This catalogue provides extensive documentation of the benefits to health and wellbeing from parks and recreation. It arose out of the 'benefits movement' in the United States and Canada in the 1980's. It provides an overview of current research evidence to support numerous benefit statements. It was intended to help workers in fields such as recreation, parks, sports, fitness, arts and culture focus on outcomes. The benefits are grouped around eight marketing messages, which are: recreation and active living are essential to personal health; recreation is a key to balanced human development; recreation and parks are essential to quality of life; recreation reduces self-destructive and anti-social behaviour; recreation and parks build strong families, and healthy communities; recreation reduces health care, social service, and police/justice costs; recreation and parks are significant economic generators in the community; and parks, open spaces, and natural areas are essential to ecological survival. One section of the catalogue is devoted to each of these messages, and contains a summary of the benefits and documents the supporting literature. The aim is to help reposition and promote parks and recreation as essential services. This is a very comprehensive report, and has considerable value as a management tool.

Coleman, D. & Iso-Ahola, S., E. 1993. Leisure and Health: The Role of Social Support and Self-Determination. *Journal of Leisure Research*, **25**, 111-128.

Considerable evidence has shown that stressful life circumstances induce physical and mental illnesses. However, the impact of these illnesses can be limited by various coping processes including leisure participation. This paper reviews the literature on the social context of health to identify ways in which leisure contributes to health.

Csikszentmihalyi, M. & Kleiber, D. A. 1991. Leisure and Self-Actualization. In: *Benefits of Leisure* (Ed. by Driver, B. L., Brown, L. R. & Peterson, G. L.), pp. 91-102. State College, Pennsylvania: Venture Publishing.

This paper addresses the prospect of resurrecting a concept of leisure in terms of self-actualisation, which according to ancient Greeks, is obtained when individuals use their free time to explore the limits of their potential, and to expand the range of their mental, physical, and social skills. Before a discussion on modern interpretation of self-actualisation the authors briefly review other descriptions of leisure as commonly understood, and to identify when and to what extent self-actualisation is associated with them.

Cordell, K. H. & Teasley, J. 1998. Recreational Trips to Wilderness: Results From the USA National Survey on Recreation and Environment. *International Journal of Wilderness*, **4**, 23-27.

This article reports some results from the 1994-95 National Survey on Recreation and Environment conducted in the United States. A general population sample of nearly 12,000 participants 16 years or older were asked about recreation participation and about recreational trips, including trips to wilderness areas. Among other results, the paper reports that during the 1994-95 survey period approximately 96% of the U.S. population 16 years or older participated in some form of outdoor recreation.

Driver, B. L., Brown, P. J. & Peterson, G. L. 1991. *Benefits of Leisure*. State College, Pennsylvania: Venture Publishing, Inc.

This publication is a collection of works on the benefits of leisure that covers a broad range of benefits. Each of the 57 authors was commissioned to contribute from their own area of expertise. The text has five introductory chapters, 21 state-of-knowledge chapters generally about a specific type of benefit, eight from different disciplines with a strong methodological or epistemological orientation, as well as one summary chapter. The aims of this document are to explain the need for systematic information on the benefits of leisure, document current knowledge, and recommend directions for future study and analysis. Of particular interest are the chapters on the psychophysiological indicators of leisure benefits, leisure and self-actualisation, recreation for the mentally ill, the spiritual benefits of leisure participation and leisure settings, parks and recreation as more than fun and games, and environmental benefits and human leisure.

Driver, B. L., Dustin, D., Baltic, T., Elsner, G. & Peterson, G. L. 1996. *Nature and the Human Spirit: Toward an Expanded Land Management Ethic*. State College, PA: Venture Publishing, Inc.

The theme of this text is the spiritual connection humans have with nature. This topic is explored in terms of land management in an extensive collection of articles by authors from many different disciplines. But in essence, this book calls for an expanded land management ethic that promotes ecosystem sustainability. Hence, although it focuses on the spiritual aspects of the human relationship with

nature, it encompasses the whole of the human relationship with nature, including the more practical aspects of natural resource management (i.e. the way humans use and value public lands) and human health.

Driver, B. L., Nash, R. & Haas, G. 1987. Wilderness Benefits: A State-of-Knowledge Review. In: *Proceedings - National Wilderness Research Conference: Issues, State-of-Knowledge, Future Directions (Fort Collins, July 23-26, 1985)* (Ed. by Lucas, R. C.), pp. 293-319. Fort Collins: Intermountain Research Station.

Although not the most recent of publications, this paper is useful as it provides a classification of benefits arising from exposure to wilderness. Categories determined by the authors include personal, social, and intrinsic benefits. A need for more objective information on wilderness benefits, especially in terms of formulating a sounder wilderness philosophy is identified.

Elsner, G., Lewis, D., Snell, F. & Spitzer, W. 1996. The Role of Public Lands in Maintaining and Rejuvenating the Human Spirit. In: *Nature and the Human Spirit: Toward an Expanded Land Management Ethic* (Ed. by Driver, B. L., Dustin, D., Baltic, T., Elsner, G. & Peterson, G. L.), pp. 9-13. State College, PA: Venture Publishing, Inc.

This paper details why public land managers need to understand the full range of benefits derived from human interactions with the natural world, or the human dimensions of ecosystem management. The authors state that although researchers have studied the economic, environmental, psychological, and social benefits of nature, research is yet to be carried out on the relationship between nature and the human spirit. Specific questions addressed by this paper include "Why study the spirit/nature relationship?" and "How important is renewal of the human spirit?"

Freimund, W. A. & Cole, D. N. 2001. Visitor Use Density and Wilderness Experience: Proceedings; 2000 June 1-3, Missoula MT. pp. 67. Ogden, UT: United States Department of Agriculture Forest Service, Rocky Mountain Research Station.

This publication is the result of a workshop convened to assess the progress and offer further ideas regarding scientific contributions to understanding relationships between visitor use density and wilderness experiences and applying this knowledge to decisions about use limitation in wilderness and parks. Papers include reviews of previous research, discussion of issues related to use limitation, and exploration of the solitude concept and of visitor conflict.

Furnass, B. 1979. Health Values. In: *The Value of National Parks to the Community: Values and Ways of Improving the Contribution of Australian National Parks to the Community* (Ed. by Messer, J. & Mosley, J. G.), pp.60-69. University of Sydney: Australian Conservation Foundation.

Although written some time ago, in this article Furnass provides a succinct and informative account of the relationship of humans to their environment and the resulting effects on health that is still relevant today. Apart from a brief overview on the evolutionary aspects, Furnass also provides discussion on the physical, psychological, and spiritual benefits to be gained from the natural environment, and the contribution of parks to health. This paper takes a critical stance towards technological “progress”, and the state of the urban environment.

Godbey, G., Graefe, A. & James, S. W. 1992. The Benefits of Local Recreation and Park Services: A Nationwide Study of the Perceptions of the American Public. pp. 1-139. Pennsylvania: National Recreation and Park Association.

The purpose of this study is to determine the benefits of local recreation and park services perceived by the American public. It is concerned with the types of benefits at an individual, household, and community level, the comparative importance of such benefits, perceived performance of the respondent's local recreation and park agency in providing such benefits, the relationship between perceived benefits and the respondent's socio-economic and demographic status, and the use of local recreation and park services. A telephone interview and follow-up questionnaire were used to collect information from approximately 1300 and 500 respondents respectively. Findings show that local recreation and park services are used by the vast majority of the public, substantial perceived benefits are derived by both users and non-users, community benefits are an important aspect of local recreation and park services, benefits are mostly associated with individual or social domains, local recreation and park services provide benefits to a wide range of individuals and families as both users and non-users.

Hamilton-Smith, E. & James, M. 1992. Recreation and Wellness. Coburg, Victoria: Department of Leisure Studies, Phillip Institute of Technology.

The proceedings of an Australian national workshop, entitled the National Wellness Conference, at the Phillip Institute of Technology in Melbourne on the 12th -13th March, 1992, are reproduced in this document. Topics covered include: the conceptual basis of wellness; state policies and services; services for specific populations; and several research reports. Although somewhat limited in scope, several of the research reports provide valuable information, in particular those dealing with being in the environment, and the social psychology of physical activity.

Nettleton, B. 1992. Being in the Environment. In: *Recreation and Wellness* (Ed. by Hamilton-Smith, E. & James, M.), pp. 127-155. Coburg, Victoria: Department of Leisure Studies, Phillip Institute of Technology.

The focus of this paper is on the influence of the natural environment on human emotional wellbeing. The author provides a somewhat philosophical discussion on the relationships between health, activity, and the environment according to the extent to which individuals possess a 'sense of coherence' (based on the work of Antonovsky, 1987). More specifically, the author addresses the notion of adequate provision of open space in urban environments, the relationship to emotional wellbeing, and positive effects on health. Also included is a discussion of relevant literature on whether natural scenes are preferred to urban ones, the perception of natural settings associated with positive emotions, and the experience of nature in urban settings. Some important points raised include: the detrimental effects of 'fast living' on human health and the positive effect of natural environments on mood state.

O'Sullivan, E. 2001. Repositioning Parks & Recreation: Parks and Recreation as Essential to Well-Being. *Parks and Recreation*, **36**, 88-95.

Aimed at park managers, this article is a call to action for the repositioning of parks in terms of health and wellbeing. Physical, psychological, social, intellectual, economic, and environmental relationships between parks and recreation and holistic wellbeing are described, as well as a series of steps designed to achieve this goal.

Payne, L., Orsega-Smith, B., Godbey, G. & Roy, M. 1998. Local Parks and the Health of Older Adults. *Parks and Recreation*, **33**, 64-73.

The authors provide a very useful discussion of the repositioning of parks for health in the United States, in relation to health promotion, and the potential savings to the health care expenditure in terms of older adults. The authors suggest that if local park and recreation services can be shown to constitute an investment in the wellness of a population that ultimately is shown to save tax dollars for the health care system, then they should be considered an essential investment in public health. They continue by citing the results of an exploratory study investigating the demographic and health characteristics of older parks users, the types of activities older people do in parks, self-reported health benefits of users, and differences in doctor visits. The methodology involved a questionnaire of open and closed questions and a daily-diary. Major findings included: park use amongst older residents was extensive, older visitors who were active in parks were healthier than sedentary users and non-users, and active park users had significantly fewer physician visits regardless of age, income, and health status than non-active users, and non-users. The authors conclude that because local parks are accessible to the majority of older Americans, generally impose no fees or charges for admission, and lend themselves to a variety of pleasurable uses that result in physical activity and stress reduction, they should be considered an integral part of the health care system. The findings of this study have implications for all park types and the health of populations as a whole.

Roberts, E. 1996. Place and Spirit in Public Land Management. In: *Nature and the Human Spirit: Toward an Expanded Land Management Ethic* (Ed. by Driver, B. L., Dustin, D., Baltic, T., Elsner, G. & Peterson, G. L.), pp. 61-80. State College, PA: Venture Publishing, Inc.

The author explores the human-nature interaction of “place”, where place is defined as a spatial part of the environment that one is related to through one’s experiences, imagination, or feelings. In this article, however, Roberts is concerned with natural places rather than human-made ones, and their ability to satisfy the human spirit. She examines the sociological aspects of place as well as relating a historical account of research in this area. Roberts concludes by discussing guidelines for land management, including protecting and restoring biodiversity, integration of human culture within ecosystem management policies, increasing designated wilderness areas, and assessing the psychological impacts of amenity infrastructure. Although this article has an American focus, much of the theory and land management principles discussed have relevance to both developed and undeveloped nations.

Rolston, H., III. 1991. Creation and Recreation: Environmental Benefits and Human Leisure. In: *Benefits of Leisure* (Ed. by Driver, B. L., Brown, L. R. & Peterson, G. L.), pp. 493-405. State College, Pennsylvania: Venture Publishing.

This article is a philosophical discussion on leisure and recreation in natural environments, how human leisure is tied to environmental benefits, as well as attempts to clarify what is meant by “environmental benefits”. The author states that the preservation of nature and the presence of nature-based recreation are empirically and logically inseparable. The article includes discussion of the relationship between benefits, environment and leisure, and explanation of aesthetic benefits, scientific benefits, historical benefits, endangered species/ ecosystem benefits, religious/philosophical benefits, and intrinsic natural values.

Sydney Urban Parks Education and Research Group (SUPER). 2001. The Social Benefits of Public Open Space - A Review. pp. 1-41. Sydney: NSW National Parks and Wildlife Service and SUPER Group.

This report is primarily concerned with the social benefits associated with the provision and management of parks and gardens. Benefits were defined as any improved or advantageous condition of an individual, group, organisation, community, society as a whole, or any other entity, such as the environment. Some of the benefits discussed include: optimising access to green space; opportunities for socialising; opportunities for spirituality; developing personal and community identity; and strengthening the community. Existing literature was reviewed and recommendations made for future research.

Ulrich, R. S., Dimberg, U. & Driver, B. L. 1991. Psychophysiological Indicators of Leisure Benefits. In: *Benefits of Leisure* (Ed. by Driver, B. L., Brown, L. R. & Peterson, G. L.), pp. 73-89. State College, Pennsylvania: Venture Publishing.

The stated objectives of this paper are to: examine the use of psychophysiological methods for investigating consequences of leisure experiences; examine the role of leisure activities and leisure environments, particularly natural environments, in helping people cope with various types of stressors; and examine the possibilities of and challenges for future research. The primary interest of the authors is the application of psychophysiological approaches to the issue of restorative influences of leisure activities and settings, and how they facilitate coping with everyday stresses. Psychophysiological methods are concerned with physiological responses of human emotions, cognition, stress and behaviour. Most of the discussion concerns psychophysiological approaches for investigating restorative benefits of leisure experiences in natural environments, rather than those benefits associated with exercise. The article provides an overview of physiological methods used in psychophysiology that can potentially be applied to investigate the benefits of leisure experiences, their limitations, capabilities, and advantages. Later discussion focuses on the stress-reducing consequences of leisure encounters in natural environments.

Viewing Nature & Being in Natural Environments

Hartig, T., Mang, M. & Evans, G. W. 1991. Restorative Effects of Natural Environment Experiences. *Environment & Behavior*, **23**, 3-26.

This paper reports on the results of a quasi-experimental field study and true experiment exploring the utility of different theoretical models of the restorative experience of natural environments. The quasi-experimental field study compared the restorative abilities of wilderness backpacking and nonwilderness vacation conditions, as well as a control condition. The true experiment compared the urban environment, natural environment, and passive relaxation conditions. Convergent self-report and performance results obtained from participants in both studies showed that greater restorative effects arise from experiences in nature. The authors also discuss implications for theory, methodology, and design.

Kaplan, R. & Kaplan, S. 1989. *The Experience of Nature: A Psychological Perspective*. Cambridge, New York: Cambridge University Press.

The Experience of Nature provides a comprehensive analysis of the psychological benefits of contact with natural environments. In addition to this however, it also provides a solid theoretical framework in order to understand the how these benefits arise. Although aimed at a wider audience, the content is scientific and evidence-based. The authors cover the human relationship with nature, benefits of contact with nature, and its restorative abilities. The primary concern of this text is contact with plants, vegetation, and natural landscapes as opposed to fauna/companion animals.

Kaplan, S. 1995. The Restorative Benefits of Nature: Toward and Integrative Framework. *Journal of Environmental Psychology*, **15**, 169-182.

Directed attention plays an important role in human information processing; its fatigue, on the other hand, has far-reaching consequences. Attention restoration theory provides an analysis of the kinds of experiences that lead to recovery from such fatigue. Natural environments turn out to be particularly rich in the characteristics necessary for restorative experiences. An integrative framework is proposed that places both directed attention and stress in the larger context of human-environment relationships.

Kuo, F. E. 2001. Coping With Poverty: Impacts of Environment and Attention in the Inner City. *Environment & Behavior*, **33**, 5-34.

This paper presents the results of a study conducted on urban public housing residents with differing levels of access to “green” nature. Attentional functioning and effectiveness in managing major life issues were compared between 145 residents randomly assigned to buildings with and without nearby nature. Residents living in buildings without nearby trees and grass reported more procrastination in facing their major issues and assessed their issues as more severe, less soluble, and more long-standing than those residents living in greener surroundings.

Kweon, B.-S., Sullivan, W. C. & Wiley, A. R. 1998. Green Common Spaces and the Social Integration of Inner-city Older Adults. *Environment & Behavior*, **30**, 832-858.

This study examined the relationship between varying amount of exposure to green outdoor common spaces and the strength of ties among neighbours. The authors interviewed 91 older adults from an inner city neighbourhood. Results demonstrated that the use of green outdoor common spaces predicted the strength of neighbourhood social ties and sense of community.

Leather, P., Pyrgas, M., Beale, D. & Lawrence, C. 1998. Windows in the Workplace. *Environment & Behavior*, **30**, 739-763.

This article investigates the direct and indirect effects of windows in the workplace on job satisfaction, intention to quit, and general wellbeing. Three mechanisms were examined: general level of illumination; sunlight penetration; and view. Results showed a significant direct effect for sunlight penetration on job satisfaction, intention to quit, and general wellbeing. A view of natural elements (i.e. trees, vegetation, plants) was found to buffer the negative impact of job stress on intention to quit and to have a similar (although marginal) effect on general wellbeing. Interestingly, no effects for general level of illumination were found.

Levitt, L. 1988. Therapeutic Value of Wilderness. In: *Wilderness Benchmark 1988: Proceedings of the National Wilderness Colloquium* (Ed. by Freilich, H. R.), pp. 156-168. Tampa, Florida: Southeastern Forest Experiment Station, Forest Service, US Department of Agriculture.

Levitt provides an informative discussion of the growing recognition of the therapeutic value of wilderness for individuals with psychological, social, and physiological disorders. She reports on benefits relating to personal, social, emotional, cognitive, and psychomotor aspects. The discussion is broadened, however, to include how these individual benefits in turn can lead to societal and economic benefits. Issues and recommendations include: improved experimental research designs, program planning, expansion of and more government support for such programs, and networking among rehabilitative personnel and wilderness managers.

McDonald, M., Williams, K. & Hamilton, S. 2000. The Nature of Peak-Experience in Wilderness: A Victorian National Park Study. *Parks and Leisure Australia*, **March**, 34-37.

McDonald et al studied peak-experiences in wilderness environments using a mail survey. Subjects comprised previous visitors to a wilderness area. Findings suggest that a peak-experience in a wilderness setting contains psychological qualities similar to Maslow's (1964) original peak-experience research, although much broader in scope. The experiences were highly valued by participants and were triggered by a range of environmental conditions and landscapes. Respondents supported a number of park management actions to preserve and facilitate opportunities for deep psychological experience in wilderness areas.

Miles, J. C. 1986. Wilderness as Learning Place. *Journal of Environmental Education*, **18**, 33-40.

Miles documents the use of wilderness and outdoor education in the United States, beginning with Thoreau. Among the benefits discussed is the fact that wilderness challenges the whole person, compared to conventional schooling, which the author states emphasizes intellectual growth, partially attends to physical growth, and virtually ignores the emotional and spiritual aspects of growth. This article provides a valuable description of the way humans connect to nature via wilderness experiences.

Moore, E. O. 1981. A Prison Environment's Effect on Health Care Service Demands. *Journal of Environmental Systems*, **11**, 17-34.

This study looked at the impact of a corrections environment on prisoners through a process of monitoring inmate attendance at a sick call clinic. Although data was collected on several variables, of interest is the finding that prisoners living in cells with views to the "outside world", consisting of green farmland and forests, had a significantly lower attendance at sick call than prisoners whose cells looked inward to the prison yard. In referring to landscape preference research documenting the stress-reduction benefits of natural views, Moore concluded that those prisoners with a natural view might have benefited from stress relief, compared to those whose views faced the prison yard. Perhaps the fact that the prisoners with a view outside of the prison walls also experienced a sense of freedom and escape that may have influenced the results.

Newell, P.B. 1997. A Cross Cultural Examination of Favourite Places. *Environment & Behavior*, **29**, 495-515.

Newell cites research demonstrating that being in a favourite place or viewing preferred environmental features offers individuals a chance to recuperate from stress. Newell studied the favourite places of subjects from Senegal, Ireland and the United States for cross-cultural comparison of environmental preferences. Participants were asked to identify their favourite place and give the reason it was chosen, the aim being to test whether people from different cultures share a preference for certain environments or features, including both built and natural environments. Sixty-one percent of participants identified a part of the natural

environment as their favourite place, and across all countries the reasons given were “relaxation” or “to recharge”, “safety”, or ecological reasons. This indicates that across the human population there is a preference for natural environments, regardless of nationality or culture. Newell concludes that the data strongly support the hypothesis of biophilia.

Parsons, R. 1991. The Potential Influences of Environmental Perception on Human Health. *Journal of Environmental Psychology*, **11**, 1-23.

This article provides a detailed and technical account of the positive psychophysiological effects of natural environments. In doing so, Parsons provides a comparative discussion of the Kaplans’ and Ulrich’s work on environmental aesthetics. A brief review on the relevant literature on environmental preferences and the perceived benefits and possible health effects of exposure to natural environments is also provided. Parsons compares Ulrich’s (1977, 1983) psychoevolutionary model and Kaplan and Kaplan’s (1989) and Kaplan’s (1987) functionalist evolutionary perspective. The possibility that there may be two affective response systems related to the classic human stress response (Cannon’s flight-or-fight response; Selye’s general adaptation syndrome) is also raised. In terms of a detailed description of the physiological mechanisms involved in the human/animal response to certain environments and situations this paper is most useful.

Parsons, R., Tassinary, L. G., Ulrich, R. S., Hebl, M. R. & Grossman-Alexander, M. 1998. The View From the Road: Implications for Stress Recovery and Immunization. *Journal of Environmental Psychology*, **18**, 113-140.

Driving is known to be a stressful activity, and causes several physiological changes in the body, including: activation of the sympathetic nervous system, increased blood pressure, increased heart rate, and an increase in heart rate variability. Stress recovery and immunisation were measured in subjects exposed to one of four simulated drives (drives with forest/rural scenery, drives along the outside of golf courses, drives through urban scenes, and drives through mixed roadside scenery), immediately following and preceding mildly stressful events. Findings demonstrated that participants who viewed nature-dominated drives experienced quicker recovery from stress and greater immunisation to subsequent stress than participants who viewed artifact-dominated drives.

Rohde, C. L. E. & Kendle, A. D. 1994. Report to English Nature - Human Well-being, Natural Landscapes and Wildlife in Urban Areas: A Review. Bath: University of Reading, Department of Horticulture and Landscape and the Research Institute for the Care of the Elderly.

This major review of the evidence documenting the relationship between human health, wellbeing, and natural environments provides valuable insight into the majority of issues and gaps in knowledge. It is based on a wide range of literature, predominantly psychological, that was available at the time. The authors state that they highlight research of value and show where claims are being made that are unfounded, to illustrate to the non-psychologist/sociologist the degree to which such abstract concepts can never be ‘proven’.

Rohde, C. L. E. & Kendle, A. D. 1997. Nature for People. In: *Urban Nature Conservation - Landscape Management in the Urban Countryside* (Ed. by Kendle, A. D. & Forbes, S.), pp. 319-335. London: E & FN Spon.

Rohde and Kendle discuss the psychological value of nature for people in urban areas, with a strong emphasis on parks. They list some of the personal benefits of urban nature described by Mostyn (1979), including emotional, intellectual, social, and physical. Also referred to, are the psychological benefits described in their review cited above (Rohde & Kendle, 1994), incorporating five categories: emotional, cognitive, developmental, behavioural, and social. This paper provides an insightful discussion, and critique of, the landscape preference literature, addressing the fact that different people respond differently to particular landscapes and environments according to their attitude towards life, values, perceptions, agendas, etc. The authors conclude by stating that environmental education will play a key role in helping people understand the human-nature relationship and the importance of conservation of nature in urban areas.

Taylor, A. F., Kuo, F. E. & Sullivan, W. C. 2001. Coping With ADD: The Surprising Connection to Green Play Settings. *Environment & Behavior*, **33**, 54-77.

This study investigated whether contact with everyday nature could positively affect attentional functioning in children. This question was addressed by focussing on children with Attention Deficit Disorder (ADD). The authors examined the relationship between children's nature exposure through leisure activities and their attentional functioning using both within- and between-subjects comparisons. Parents were surveyed regarding their child's attentional functioning after activities in several settings. Results indicated that children function better than usual after activities in green settings and that the "greener" a child's play area, the less severe his or her attentional deficit symptoms. Taylor et al conclude that contact with nature may support attentional functioning in a population of children who desperately need attentional support.

Taylor, A. F., Wiley, A., Kuo, F. E. & Sullivan, W. C. 1998. Growing up in the Inner City: Green Spaces as Places to Grow. *Environment & Behavior*, **30**, 3-28.

Taylor et al describe the results of a study that examined the effect of trees and grass on children's development. They observed 64 urban public housing outdoor spaces, where 27 were classified as having low vegetation, and 37 were classified as having high vegetation, on four separate occasions. In the spaces with relatively low levels of trees and grass the amount of play by children and their access to adults was approximately half that of children who lived near greener spaces. Also, the incidence of creative play was significantly lower in barren spaces than in the greener areas. They conclude that trees and grass may foster everyday activities and experiences important in children's development.

Tennessen, C. M. & Cimprich, B. 1995. Views to Nature: Effects on Attention. *Journal of Environmental Psychology*, **15**, 77-85.

Tennessen and Cimprich report findings of a study in which university students who were given a test were compared based on whether or not they had a natural

view. Their work is based on the theoretical view that suggests under increased demands for attention, individuals' capacity to direct attention may become fatigued. Once fatigued, attentional restoration must occur in order to return to a more effectively functioning state. The capacity to direct attention was measured using a battery of objective and subjective measures. They found that natural views were associated with better performance on attentional measures.

Ulrich, R. S. 1984. View Through a Window May Influence Recovery From Surgery. *Science*, **224**, 420-421.

Ulrich examined the restorative effect of natural views on surgical patients in a suburban hospital. Findings revealed that recovery rates of patients with a natural view recovered faster, spent less time in hospital, had better evaluation from nurses, required fewer painkillers, and had less postoperative complications compared to those that viewed an urban scene. Although the findings may be significant, it is worth noting that the patients who viewed an urban scene had a view consisting of a largely featureless brick wall. Ulrich concludes that the results should not be extended to all built views, or to other patient groups. Despite this, the evidence demonstrates that natural views do indeed enhance recovery rates, and the extent to which this applies broadly to all patient groups is worthy of further investigation.

Ulrich, R. S. 1986. Human Responses to Vegetation and Landscapes. *Landscape and Urban Planning*, **13**, 29-44.

This paper provides an overview of research findings concerning human responses to natural and urban visual landscapes. Ulrich makes a point of eliminating "intuitive" literature, preferring to focus on more rigorous studies. He concludes that views of nature, when compared to most urban scenes lacking natural elements such as trees, appear to have more positive influences on emotional and physiological states. The benefits of visual encounters with vegetation may be greatest for individuals experiencing stress or anxiety. Recent research demonstrates that responses to trees and other vegetation can be directly linked to health, and in turn related to economic benefits of visual quality.

Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A. & Zelson, M. 1991. Stress Recovery During Exposure to Natural and Urban Environments. *Journal of Environmental Psychology*, **11**, 231-248.

Ulrich and colleagues studied the effects of different natural and urban scenes on subjects who had just watched a stressful film (horror genre). The authors measured a whole array of physiological measures (including heart rate, skin conductance, muscle tension and pulse transit time - a non-invasive measure that correlates with systolic blood pressure). Findings showed that recovery was faster and more complete when subjects were exposed to natural rather than urban scenes. The physiological data measured by this study suggests that natural settings elicit a response that includes a component of the parasympathetic nervous system that is associated with the restoration of physical energy.

Williams, K. & Harvey, D. 2001. Transcendent Experiences in Forest Environments. *Journal of Environmental Psychology*, **21**, 249-260.

Williams and Harvey surveyed people visited, worked, or lived in forests, asking them to describe a transcendent moment experienced in the forest environment. Participants described the cause, their thoughts, and behaviour associated with the event. Their findings suggest that transcendent episodes experienced in forests take more than one form and can be distinguished by the qualities of compatibility and novelty. This is one of few empirical studies to investigate the spiritual value of nature.

Yeou-Lan, D. C. 1996. Conformity with Nature: A Theory of Chinese American Elders' Health Promotion and Illness Prevention Processes. *Advanced Nursing Science*, **19**, 17-26.

Grounded theory methodology was used to generate a theory describing and explaining the beliefs and behaviours regarding health promotion and illness prevention among Chinese elders in the United States. From the data emerged the theory of conformity with nature. Three interrelated subprocesses were identified: harmonising with the environment, "following bliss", and "listening to heaven". The beliefs put forward by Chinese elders are parallel to those of an ecological theory of health.

Plants, Gardening, & Horticultural Therapy

Browne, C. A. 1992. The Role of Nature for the Promotion of Well-Being in the Elderly. In: *Role of Horticulture in Human Well-being and Social Development: A National Symposium* (Ed. by Relf, D.), pp.75-79. Arlington, Virginia: Timber Press.

This paper reports findings from a research project directed at understanding the extent to which outdoor settings within retirement communities promote psychological, social, and physical wellbeing. Specifically, the author addresses five areas in which nature may impact wellbeing, including aesthetics, environmental stimulation, social interaction, motivation for physical exercise, and self-expression. Methods consisted of a multithread approach, incorporating twelve site visits, two questionnaires (one to management and one to residents), and interviews with selected residents of four retirement communities to determine their outdoor visual and spatial preferences.

Capra, F. 1997. Turn, Turn, Turn: Understanding Nature's Cycles. In: *A Garden in Every School: Cultivating a Sense of Season and a Sense of Place, March 15 1997*, pp. 1-9. Martin Luther King Middle School: Center for Ecoliteracy.

Capra demonstrates how gardening reconnects children not only to the fundamentals of food, but also to the fundamentals of life. He bases his discussion on the concept that there is a basic pattern of life that is common to all living systems, including living organisms, ecosystems, and social systems. The basic pattern referred to is a network: a web of relationships among plants, animals, and microorganisms in an ecosystem, or among people in a human community. He states that key characteristics of these networks are the flow of energy, and the cycle of nutrients. This presentation was part of a conference held at the Martin Luther King Middle School, the site of the Edible Schoolyard, in Berkeley, California.

Coley, R. L., Kuo, F. E. & Sullivan, W. C. 1997. Where Does Community Grow? The Social Context Created by Nature in Urban Public Housing. *Environment & Behavior*, **29**, 468-495.

This study examined how the availability of nature influences the use of outdoor public spaces in two Chicago public housing developments. Observations were collected of the presence and location of trees and the presence and location of youth and adults in semiprivate spaces at one high-rise and one low-rise public housing development. Results consistently indicated that natural landscaping encourages greater use of outdoor areas by residents. Spaces with trees attracted larger groups of residents, as well as more mixed groups of youth and adults, than did spaces devoid of nature. In addition, more dense groupings of trees and trees that are located close to public housing buildings attracted larger groups of people. These findings suggest that natural elements such as trees promote increased opportunities for social interactions, monitoring of outdoor areas, and supervision of children in impoverished urban neighbourhoods.

Francis, M. & Hester Jr, R. T. 1990. *The Meaning of Gardens: Idea, Place and Action*. Cambridge Massachusetts, London England: The MIT Press.

This book is drawn in part from papers presented at the Meanings of the Garden Conference in 1987. The conference brought together people from many different disciplines to discuss as well as define the role that gardens play in people's lives and in society. Contributors include Stephen and Rachel Kaplan, Charles Lewis, and many others who provide informative and insightful discussions on the human relationship with plants.

Grese, R. E., Kaplan, R., Ryan, R. L. & Buxton, J. 2000. Psychological Benefits of Volunteering in Stewardship Programs. In: *Restoring Nature: Perspectives from the Social Sciences and Humanities* (Ed. by Gobster, P. H. & Hull, R. B.), pp. 265-279. Washington, D.C.: Island Press.

Grese et al surveyed volunteers to determine their motivations for, and benefits derived from, volunteering in stewardship programs. They surveyed 190 people involved in variety of volunteer organisations and activities including, a

conservation program, a stream monitoring program, a natural areas preservation program, and a park volunteer organization. Findings showed that volunteers were highly motivated by a strong desire to help the environment, benefited from opportunities to reflect and seek spiritual fulfillment, and developed friendships and social networks.

Gerlach-Spriggs, N., Kaufman, R. E. & Warner, S. B., Jr. 1998. *Restorative Gardens - The Healing Landscape*. New Haven: Yale University Press.

Presented here is a convincing account for the incorporation of restorative gardens in health care facilities. A history of restorative gardens is presented, along with an overview of the evidence for the therapeutic effects of plants and gardening, followed by several case studies from the United States. The book is concluded with a plea for considering the essential role of gardens when planning, designing, or renovating health facilities of every type. The authors believe that all patients benefit from some contact with nature, and that gardens are as essential element in the healing of the human body and psyche.

Hull, R. B. & Vigo, G. 1992. Urban Nature, Place Attachment, Health and Well Being. In: *Role of Horticulture in Human Well-being and Social Development: A National Symposium* (Ed. by Relf, D.), pp. 149-152. Arlington, Virginia: Timber Press.

The authors discuss the health benefits of place attachment in the context of nature, in this case, plants. They discuss some of the layers of place and attachment, including boundaries, image expression, image testing, image comparison, image congruity, and functional congruity, and how urban nature contributes to these layers.

Kaplan, R. & Kaplan, S. 1989. *The Experience of Nature: A Psychological Perspective*. Cambridge, New York: Cambridge University Press.

The Experience of Nature provides a comprehensive analysis of the psychological benefits of contact with natural environments. In addition to this however, it also provides a solid theoretical framework in order to understand the how these benefits arise. Although aimed at a wider audience, the content is scientific and evidence-based. The authors cover the human relationship with nature, benefits of contact with nature, and its restorative abilities. The primary concern of this text is contact with plants, vegetation, and natural landscapes as opposed to fauna/companion animals.

Kaplan, R. & Kaplan, S. 1990. Restorative Experience: The Healing Power of Nearby Nature. In: *The Meaning of Gardens: Idea, Place and Action* (Ed. by Francis, M. & Hester Jr, R. T.), pp. 238-243. Cambridge: The MIT Press.

Here the Kaplans' document the essence of their research by discussion three themes central to their research: that the widely held assumption that gardening has important psychological effects is supported by empirical evidence; that these benefits can be identified and described; and lastly, that the restorative experience

concept provides a useful theoretical framework for understanding the significance of these benefits in people's lives.

Kaplan, S. 1992. The Restorative Environment: Nature and Human Experience. In: *Role of Horticulture in Human Well-being and Social Development: A National Symposium* (Ed. by Relf, D.), pp. 134-142. Arlington, Virginia: Timber Press.

Many pressures people face today are the results of three interacting forces, namely advances in technology, the knowledge explosion, and the increasing world population. These trends all contribute to the experience of mental fatigue, which can lead people to be less tolerant, less effective, and less healthy. In this article, S. Kaplan argues that: increasing pressures of modern living lead to problems of mental fatigue; restorative experiences are an important means of reducing mental fatigue and have a special connection to natural environments; and natural environments, in providing these deeply needed restorative experiences, play an essential role in human functioning.

Kuo, F. E. & Sullivan, W. C. 2001. Environment and Crime in the Inner City: Does Vegetation Reduce Crime? *Environment & Behavior*, **33**, 343-367.

This study reports that residents living in greener surroundings report lower levels of fear, fewer incivilities, and less aggressive and violent behaviour. Using crime reports, the relationship between vegetation and crime in an inner-city neighbourhood was examined. Crime rates for 98 apartment buildings with varying levels of nearby vegetation were compared. Results indicate that although residents were randomly assigned to different levels of nearby vegetation, the greener a building's surroundings were, the fewer crimes reported. Furthermore, this pattern held for both property crimes and violent crimes. The relationship to vegetation to crime held after the number of apartments per building, building height, vacancy rate, and number of occupied units per building were accounted for.

Lewis, C. A. 1992. Effects of Plants and Gardening in Creating Interpersonal and Community Well-Being. In: *Role of Horticulture in Human Well-being and Social Development: A National Symposium* (Ed. by Relf, D.), pp. 55-65. Arlington, Virginia: Timber Press.

Lewis discusses the process of gardening and the healing effects it can have in terms of interpersonal and community wellbeing in areas of low-income urban housing. He details some of his work with projects in low-income housing in New York and other parts of the US that resulted in neighbourhood transformation. This surprising achievement occurred through the simple act of establishing community gardens and/or community gardening competitions, which involved many of the local residents. He discusses how this process works, and also the potential healing effects of gardening in correctional institution and schools.

Lewis, C. A. 1990. Gardening as a Healing Process. In: *The Meaning of Gardens: Idea, Place and Action* (Ed. by Francis, M. & Hester Jr, R. T.), pp. 244-251. Cambridge: The MIT Press.

Lewis is a passionate advocate for the health benefits of plants, particularly in terms of psychological benefits. In this article, he articulates that plants heal via two modes: *observational* mode and *participatory* mode. Observational mode occurs when viewing vegetation in a garden or wilderness, but when the observer has no responsibility for its care (e.g. in a park or wilderness area). Participatory mode occurs when an individual is responsible for nurturing a plant or garden (or even wilderness), and it is through their efforts that the plant/s thrive. Although the act of nurturing and being responsible for plants at a more intimate level is a more intense experience than that gained through observation alone, both observation and participation produce wellbeing.

Lewis, C. A. 1996. *Green Nature/Human Nature: The Meaning of Plants in our Lives*. Urbana, Chicago: University of Illinois Press.

This text documents Lewis's search for an understanding of the human-plant relationship, and its power to heal and transform individuals, neighbourhoods, and entire communities. Although a rather personal account, Lewis presents much convincing quantitative and qualitative data as to the positive health and wellbeing effects of contact with "green nature". This is a thorough account of his many experiences, as well as providing detailed information on significant work carried out by others, such as the Kaplans'. This book promotes that beyond doubt, contact with green nature is essential to human wellbeing.

Mattson, R. H. 1992. Prescribing Health Benefits Through Horticultural Activities. In: *Role of Horticulture in Human Well-being and Social Development: A National Symposium* (Ed. by Relf, D.), pp. 161-168. Arlington, Virginia: Timber Press.

This is a useful, if brief, article describing some practical applications/techniques of horticultural therapy. As well as some definitions, the author also discusses training professionals in this field, the dynamics of horticultural therapy, and the future potential of this field.

Relf, D. 1992. The Role of Horticulture in Human Well-Being and Social Development: A National Symposium 19-21 April 1990 - Arlington, Virginia. pp. 254. Portland, Oregon: Timber Press.

As a first of its kind, this symposium brought together many researchers from different disciplines (including fine arts, sociology, psychology, urban planning, forestry, environmental psychology, and history) to examine the human context of horticulture by investigating the human relationship with plants. Papers have been grouped under the headings of: Plants and Human Culture; Plants and the Community; Plants and the Individual; Developing a Conceptual Framework; Exploring a Specific Application: Horticultural Therapy; Research Implementation; A Look at the Future: Developing a Research Initiative. The aim of the symposium was to enhance the flow of information and to establish a

research initiative on Human Issues in Horticulture. It provided an important outlet for many researchers working in this area, and since time of publication there have been six more similar symposiums. The full text of the majority of articles is presented, while others are in abstract form only.

Ulrich, R. S. & Parsons, R. 1992. Influences of Passive Experiences with Plants on Individual Well-Being and Health. In: *Role of Horticulture in Human Well-being and Social Development: A National Symposium* (Ed. by Relf, D.), pp.93-103. Arlington, Virginia: Timber Press.

Ulrich and Parsons report on the “old belief” that visual contact with plants and other nature is somehow good for people, and can help people cope with the stresses of urban living. They review contemporary theories in predicting that visual contact with environments having vegetation or other nature should have positive effects on psychological and physiological wellbeing, as well as reviewing the empirical evidence for those effects. In concluding, the authors highlight that very little work has investigated the role of views of flowers and small plants in fostering psychological and physiological wellbeing. They also suggest that the benefits of plants require further studies that assess the effects on wellbeing by using physiological and health-related measures.

Wells, N. M. 2000. At Home With Nature: Effects of “Greenness” on Children’s Cognitive Functioning. *Environment & Behavior*, **32**, 775-795.

The natural environment plays a far more significant role in the wellbeing of children in poor urban environments than has been previously recognised. The study reported here describes the linkage between the naturalness or restorativeness of the home environment and the cognitive functioning of low-income urban children. The author states that by using a premove/postmove longitudinal design, the study rules out the effects of various extraneous variables that have plagued previous studies. A standardised instrument to measure children’s cognitive functioning was used in conjunction with objective measures of naturalness before and after relocation. Results indicate that children whose homes improved the most in terms of greenness following relocation also tended to have the highest levels of cognitive functioning after the move. Wells also discusses the implications with respect to policy and design.

Contact with Animals (Pets & Wildlife) & Animal Assisted Therapy

Anderson, W. P., Reid, C. M. & Jennings, G. L. 1992. Pet Ownership and Risk Factors for Cardiovascular Disease. *The Medical Journal of Australia*, **157**, 298-301.

This study compared the risk factors for cardiovascular disease in pet owners and non-owners in an Australian sample of participants ranging from 20 to 60 years of age. The results showed that pet owners had lower levels of accepted risk factors for cardiovascular disease that could not be explained by cigarette smoking, diet, body mass index, or socio-economic status. Both male and female pet owners had significantly lower systolic blood pressure, and plasma triglycerides, and lower plasma cholesterol was found in male pet owners. There were no significant differences in plasma cholesterol levels in female pet owners and non-owners. Interestingly, pet owners reported higher levels of exercise, but consumed more meat, alcohol, and “take-away” food than non-owners.

Bauman, A. E., Russell, S. J., Furber, S. E. & Dobson, A. J. 2001. The Epidemiology of Dog Walking: An Unmet Need for Human and Canine Health. *Medical Journal of Australia*, **175**, 632-634.

The objective of this work was to describe the prevalence of dog walking in New South Wales and to identify potential health gains if more dogs were walked. This area of pet research has received much less attention than the other more psychological and social health benefits of pet ownership. Eight-hundred and ninety-four adults were surveyed. Of this sample, 46% of households owned a dog, and overall, dog owners walked 18 minutes more a week than non-owners. However, more than half of dog owners (59%) did not walk their dogs and were less likely than non-owners to meet recommended levels of physical activity sufficient for health benefits. Twenty-six percent reported that they walked their dog up to 2.5 hours per week, and 15 % reported that they walked their dog more than 2.5 hours per week. An epidemiological estimate of the proportion of coronary heart disease that might be prevented if all dog owners walked their dogs for at least 150 minutes per week is about 9% of the total burden of coronary heart disease. The authors predict that if all dog owners walked their dogs, substantial disease prevention and healthcare costs savings of \$175 million per annum could accrue. Dog walking is an important potential benefit of dog ownership. As about half of the adult Australian public is insufficiently active, dog walking should become widely recommended by human and canine health advocates.

Beck, A. & Katcher, A. 1996. *Between Pets and People: The Importance of Animal Companionship*. West Lafayette, Indiana: Purdue University Press.

This collection of works on the relationship between humans and their companion animals incorporates more than a decade of empirical research in this field, the majority of which has been conducted by the authors. It builds on an earlier work titled “New Perspectives on Our Lives with Companion Animals”. The authors review their most significant findings, and discuss them in historical, social and philosophical contexts. Their initial interest in the specific health benefits of pets grew out of a study of patients with coronary artery disease that

showed patients with pets had a significantly greater survival rate in the first year of discharge from hospital. Further work expanded and built upon these initial findings. Presented in this book is information derived from a concerted study of how people and companion animals interact. Using research techniques designed for studying animal behaviour, they observed people and pets in a variety of settings including parks and homes. Behavioural observation was combined with physiological measurement of heart rate and blood pressure, with epidemiological techniques for studying health and disease, as well as with methods of anthropology and psychiatry. The major conclusion of this book is that for humans to be healthy, and reach their full health potential, it is necessary to make contact with other living things. Although previous work documenting the health benefits of companion animals in therapeutic settings had been published, the work described here demonstrates the health benefits of contact with pets for ordinary people, as well as those undergoing therapy. This text is written in a conversational style rather than in a purely objective manner and hence has applicability to a wide audience.

Beck, A., Seraydarian, L. & Hunter, F. 1986. Use of Animals in the Rehabilitation of Psychiatric Inpatients. *Psychological Reports*, **58**, 63-66.

This study compared the impact of therapy and activity groups on two matched groups of eight and nine psychiatric patients. Daily sessions of the groups were held for 11 weeks in identical rooms except for the presence of caged finches in one of the rooms. The patients were evaluated before and after the treatment sessions using standard psychiatric rating scales. The group that met in the room that contained the caged finches had significantly better attendance and participation, and significantly improved in areas of psychiatric assessment.

Cusack, O. 1988. *Pets and Mental Health*. New York: The Haworth Press.

This book provides an overview of the mental health benefits of pets. Topics covered include pet-facilitated, or animal assisted, therapy; the human animal bond; why humans love pets; depression; stress and anxiety; psychiatric patients; pets and children; pets and adolescents; pets in the family; pets and the elderly; and pets and prisons. Of particular interest are the chapters on pet-facilitated therapy, depression, pets and the elderly, and pets in prisons. The author gives a broad, yet informative summary of primary research conducted on pets and mental health. Although somewhat dated, this work provides useful background knowledge for this area.

Cusack, O. & Smith, E. 1984. *Pets and the Elderly: The Therapeutic Bond*. New York: The Haworth Press.

This book provides useful information as to the benefits of animal assisted (or pet-assisted) therapy in the elderly and provides instruction as to how to establish a program on these principles. It includes several case studies, and contains chapters on the human/animal bond, training a therapy dog, implementing animal therapy in an institution, program suggestions, and means to evaluate a program such as prescribed here.

Fawcett, N. R. & Gullone, E. 2001. Cute and Cuddly and a Whole Lot More? A Call for Empirical Investigation into the Therapeutic Benefits of Human-Animal Interaction for Children. *Behaviour Change*, **18**, 124-133.

Considering the human species', particularly children's, attraction to non-human animals, and given the potential therapeutic benefits to be gained from the incorporation of non-human animals in therapeutic interventions, the authors provide a convincing argument for further research in this area. Topics covered include human affiliation with nature, human emotional connection with other species, and potential therapeutic pathways requiring empirical investigation. Furthermore, this article provides a thorough examination of the literature and highlights the lack of empirical research in this area. According to the authors, many studies have been flawed, or lacked empirical sophistication, and have been anecdotal or descriptive rather than empirical evaluations of outcomes.

Friedmann, E., Katcher, A., Thomas, S. A., Lynch, J. J. & Messent, P. R. 1983b. Social Interaction and Blood Pressure: Influence of Animal Companions. *The Journal of Nervous and Mental Disease*, **171**, 461-465.

The effect of the presence of a friendly dog on children's blood pressure and heart rate was examined while resting and while reading aloud. They hypothesised that the presence of the animal could reduce the physiological consequences of interpersonal communication by making the experiment or experimenter appear less threatening. The experiment was conducted in a home setting and the children were asked to rest for two minutes and then read aloud for two minutes from a children's book. In one treatment a friendly dog was present in the room, and in the other it was not. The presence of the dog was associated with lowered blood pressure and heart rate both while the children rested and while they read aloud (a mildly stressful task). The authors speculate that the presence of the pet modifies the subjects perception of the experimenter and the environment by making both less threatening and more friendly, which translates into a decrease in blood pressure and heart rate response to verbalisation. The lessening of this physiological response in this way may be responsible for the some of the effectiveness of the use of dogs in psychotherapy.

Friedmann, E. & Thomas, S. A. 1995. Pet Ownership, Social Support, and One-year Survival After Acute Myocardial Infarction in the Cardiac Arrhythmia Suppression Trial (CAST). *American Journal of Cardiology*, **76**, 1213-1217.

Social support and pet ownership have both been associated with increased coronary artery disease survival. The independent effects of pet ownership, social support, disease severity, and other psychosocial factors on one-year survival after acute myocardial infarction are examined. One-year survival data were collected from 369 patients of whom 112 subjects owned pets, and 20 subjects died. Logistic regression indicates that high social support and owning a pet tend to predict survival independently of physiologic severity and demographic and other psychosocial factors. Dog owners are significantly less likely to die within one year of than those who did not own dogs. These data confirm and extend previous findings relating to pet ownership and social support to survival among patients with coronary artery disease.

Headey, B., & Anderson, W. 1995. Health Cost Savings: The Impact of Pets on Australian Health Budgets. Melbourne: Petcare Information and Advisory Service.

The Australian National People and Pets Survey conducted in 1994 demonstrated that dog and cat owners make fewer doctor visits and appear to have better overall health than non-owners. Based on this finding, the authors set out to estimate the potential savings in health expenditure from the presence of pets in the majority of Australian households. Their calculations indicate that the presence of pets could save between \$790 million and \$1.5 billion annually. The authors also outline future research requirements to enable more precise estimates of savings resulting from pet ownership.

Howard, P. & Jones, D. N. 2000. For the Love of Fur and Feathers: Wildlife Feeding in Urban Settings in South-East Queensland Preliminary Findings. pp. 1-8. Nathan: Griffith University.

The preliminary findings reported here show that feeding native wildlife adds considerably to the respondents quality of life. This study, conducted in Brisbane, Australia, investigated why people choose to feed native fauna and what they considered the benefits and harms of feeding were. The authors investigated the phenomenon of wildlife feeding in suburban backyards, as opposed to feeding wildlife in parks and gardens. By use of interviews and a questionnaire, approximately 170 respondents were surveyed, including six professional wildlife managers. The majority of respondents, however, were 45 years or older and were retired or occupied by home duties. Some of the most common reasons given as to why respondents fed wildlife were that they wanted to: make up for human destruction of the environment; be near nature; that animals improved their quality of life; and because people learned from animals. Some respondents stated that they themselves benefited more from the interaction than the animals. Wildlife managers had the strongest opposition to wildlife feeding, as they believed that if people find it acceptable to feed animals visiting their homes then they would translate this behaviour to feeding wildlife in national parks or other natural areas. This could potentially cause management problems associated with animal aggression towards humans, unsustainable wildlife populations, spread of disease, and vulnerability to predation. In terms of enhancing respondents' quality of life, the authors concluded that the willingness of respondents to bear the sometimes substantial cost of feeding, the level of detail given to observations, and the sense of wonder in describing the antics of the wildlife they feed suggest that these experiences are an important part of their daily routine and add significantly to respondents' quality of life. Furthermore, the authors cite unpublished data indicating that 38% of the population in Brisbane buy food with the sole purpose of feeding wildlife. One shortcoming of this study is that since respondents were not selected randomly from the population, data was likely to have been generated from a biased sample. However, it raises questions worthy of further investigation.

Katcher, A. & Beck, A. 1987. Health and Caring for Living Things. *Anthrozoos*, **1**, 175-183.

The theme of this paper is that unlike any generation of human beings since the inception of agriculture, human existence in industrialised societies is deprived of opportunities for nurturing and for affectionate interchange with others. The authors argue that care of nature, including farm animals, pets, gardens, and contact with wilderness permits the expression of nurturing beyond that associated with raising children, which has beneficial effects on human health and wellbeing. Furthermore, they state that nurturing living things and contact with nature is likely to be a necessary part of human development. It is proposed that since nurturing is a biological activity with touch, odour, and rhythmic activities playing a large role, that there are likely to be psychological and biological effects from such an activity, many of which may be positive for health and wellbeing. In no era, however, have human beings been as deprived of nurturing contact with either children or animals as they are now. The cognitive, emotional, and physiological consequences of this are currently unknown. This paper adopts an evolutionary approach to examine the domestication of plants and animals, and the human relationship with nature. The authors state that there is a critical need for continued and augmented exploration of the emotional and health value of nurturing living things

Katcher, A., Friedmann, E., Beck, A. & Lynch, J. J. 1983. Looking, Talking, and Blood Pressure: The Physiological Consequences of Interaction with the Living Environment. In: *New Perspectives on Our Lives with Companion Animals* (Ed. by Katcher, A., & Beck, A.), pp. 351-360. Philadelphia: University of Pennsylvania Press.

In the studies reported here, the authors cite the positive effects that simply viewing animals can have on blood pressure. One study examined how contemplation of life in an aquarium could influence blood pressure. Participants comprised two groups; one group of subjects were young university students or university employees with relatively low blood pressure; the second group were older subjects who had been diagnosed with hypertension. Subjects were asked to read aloud for two minutes to obtain a stressed blood pressure level (reading aloud has been demonstrated to raise blood pressure). Subjects then relaxed by sitting in a chair, and watched a blank wall for twenty minutes to permit blood pressure to fall again to resting levels. Lastly, subjects were asked to watch the aquarium for a further twenty minutes. The results demonstrated that in both groups watching fish lowered blood pressure levels to below that produced by sitting in a chair relaxing, and produced a calm state of relaxation. When asked to read aloud again at the end of the study, the participants blood pressure was less than half as large as it was at the start of the experiment. The authors concluded that after the subjects relaxed by watching the fish they had a higher tolerance for stress. The results were clinically significant. In related experiments, subjects were asked to gaze at an aquarium with only plants, and no fish. It was found that subjects could not remain calm for very long, soon became restless, and their blood pressure levels began to rise.

Katcher, A. H. & Beck, A. M. 1983. *New Perspectives on Our Lives with Companion Animals*. Philadelphia: University of Pennsylvania Press.

This book is a comprehensive collection of works on the relationship between humans and companion animals that arose out of a conference, and the pioneering work undertaken at the University of Pennsylvania and the Washington State University. The conference was held at a time when researchers in a variety of disciplines were examining the human-companion animal bond, more or less in isolation. This conference aimed to consolidate the body of work that was slowly accumulating, and stimulate discussion for further exploration of the human-animal relationship. Work submitted was arranged according to the following sections: Animals and People: The Tie Between; A Social Predator for a Companion; Society with Animals; Companion Animals and Human Health; The Loss of a Companion Animal; Therapeutic Uses of Companion Animals; and the Context for Companion Animal Studies. The majority of data reported in this text has been generated from exploratory research, although some quantitative work is also included. Papers of specific interest are listed individually in this bibliography.

Katcher, A. H., Segal, H. & Beck, A. M. 1984. Comparison of Contemplation and Hypnosis for the Reduction of Anxiety and Discomfort During Dental Surgery. *American Journal of Clinical Hypnosis*, **27**, 14-21.

This paper compares the effectiveness of contemplation of an aquarium and contemplation of a poster depicting a natural scene, with and without hypnosis, in relaxing subjects about to have elective dental surgery. A control group of subjects were instructed to sit and relax for forty minutes without any specific instructions. Surgery was performed in the clinic with a general anaesthetic. Blood pressure and heart rate were measured during surgery and both the dentist and an independent observer rated the patient's outward emotional state. At the end of the surgery, the patient also rated his/her own level of relaxation. Results showed that the patients who contemplated the fish tank and/or were hypnotised were significantly more relaxed during surgery than those who contemplated the poster, or the control subjects. In the subjects who contemplated the aquarium, however, hypnosis did not change their state of relaxation. The patients who watched the aquarium in a normal state of mind were as relaxed as those who watched it under hypnosis. Conversely, in the poster contemplation group, patients under hypnosis were significantly more relaxed than those who simply looked at the poster. The authors conclude that contemplation of watching live fish in an aquarium can be an effective means of inducing calm before a stressful situation. This complements other work demonstrating the effectiveness of aquariums in similar situations.

McHarg, M., Baldock, C., Headey, B. & Robinson, A. 1995. National People and Pets Survey. pp. 1-20. Sydney: Urban Animal Management Coalition.

This survey was commissioned by the Sydney Animal Management Coalition to collect data on: the nature of pet ownership in Australia; the personal benefits that accrue from companion animals; community inconvenience attributed to dogs and cats; and future intentions of pet ownership. The survey was a national, stratified, probability survey with a sample of 1011 respondents aged 16 years of

age or older. Data was collected via telephone interviews. The main findings of interest were: that caring for a pet is the norm with 60% of Australian households having one or more pets; that those who care for a dog have better overall health compared to non-owners, (specifically, dog owners were reported to have greater physical fitness, visit the doctor less often, are less likely to take medication for high blood pressure, less likely to have sleeping difficulties, high cholesterol or a heart problem) regardless of age, sex, income, educational background, or occupational status; and that typically, owners are responsible and caring. Other findings included that 58% of dog owners walked their dog in parks or other public places (excluding beaches and the banks of rivers/creeks); 58% of pet owners stated that they got to know other people and made friends through owning a pet; and 79% of owners find it comforting to be with their pet in times of stress.

Messent, P.R. 1983. Social Facilitation of Contact with Other People by Pet Dogs. In: *New Perspectives on Our Lives with Companion Animals* (Ed. by Katcher, A. & Beck, A.), pp. 37-46. Philadelphia: University of Pennsylvania Press.

The purpose of this study was to investigate the role of pet dogs in facilitating social interactions between their owners and other people. People were observed while they were walking with their dogs to gather data not only on the social lubricant role of dogs but also on the various behavioural interactions between dog and owner, such as play, touching, and talking to the dog. The results provide clear evidence supporting the view that pets are social lubricants for typical dog owners. Even when walking in a new locality, the presence of a dog significantly increased the likelihood of contact between a stranger and the subjects. Furthermore, those subjects that walked in the park had a higher rate of contact than when walking their dog in the street. It appeared that people were friendlier in the park and so were more likely to interact with the subject. When walking dogs on their routine walk the results suggest that friendships soon develop between dog owners and with others using the same area, but friendships form more readily with other dog owners than non-owners. The authors state that forming these types of friendships will be particularly beneficial to those who are socially isolated, such as the some elderly people.

Serpell, J. 1986. *In the Company of Animals: a Study of Human-Animal Relationships*. Oxford; New York: Basil Blackwell.

This book provides a comprehensive and insightful analysis of the human relationship with animals. The author analyses the human-animal relationship from both an historical and cultural approach. He argues that in human-animal relationships, emotional and materialistic considerations are important, yet frequently in conflict. The many ways in which humans have sought to resolve this conflict is the central theme of the book.

Serpell, J. 1991. Beneficial Effects of Pet Ownership on Some Aspects of Human Health and Behaviour. *Journal of the Royal Society of Medicine*, **84**, 717-720.

To determine the impact of pet ownership on human health and wellbeing, a 10-month prospective study was conducted investigating changes in behaviour and

health status in 71 adult subjects following the acquisition of a new pet (cat or dog). A non-matching control group of 26 subjects without pets served as a comparison over the same period. The control group did not report any significant changes in health or lifestyle. Both pet owning groups, however, reported a highly significant reduction in minor health problems during the first month following pet acquisition and this effect was sustained in dog owners for the 10 months. The pet owning group also showed significant improvements in psychological wellbeing over the first six months and in dog owners, this was sustained over the 10 months of the study. In addition, dog owners reported improvements in self-esteem and were less afraid of being victims of crime. They also took considerably more exercise in the form of dog walking, and this effect continued throughout the period of the study. The findings suggest overall that pet ownership can have a positive impact on human health and behaviour and that in some cases the effects are relatively long-lasting.

Siegel, J. M. 1990. Stressful Life Events and Use of Physician Services Among the Elderly: The Moderating Role of Pet Ownership. *Journal of Personality and Social Psychology*, **58**, 1081-1086.

Current and projected demand by the elderly for health care services has prompted the study of their utilisation of medical services. Studies show that factors other than physical health status can determine frequency of use of health care services, including psychological state and stressful life events. In this study, the author hypothesised that circumstances that promote wellbeing or alleviate distress, such as pet-ownership, could reduce the need for physician contact. By controlling for demographic and health characteristics, the frequency of doctor contact was compared in owners and non-owners. Findings demonstrated that when sex, age, race, education, income, employment status, social network involvement, and chronic health problems were controlled for, respondents with pets reported fewer doctor visits over a 12-month period than non-owners. Furthermore, owning a pet seemed to buffer the effects of stress, as the accumulation of stressful life events was associated with increased doctor contacts for respondents without pets; however, this relationship did not emerge for pet owners.

Tribe, A. & Brown, P. B. 2000. The Role of Wildlife Rescue Groups in the Care and Rehabilitation of Australian Fauna. *Human Dimensions of Wildlife*, **5**, 69-85.

The rescue, rehabilitation, and relocation of Australian fauna represents probably the most intimate and expensive interaction that the majority of people have with wildlife. This paper discusses this sometimes-contentious phenomenon in light of the biophilia hypothesis, and the motivations behind why people choose to care for wildlife. Some of the motives for wildlife rescue include: personal satisfaction and development; interest in environmental conservation; appreciation of nature; concern about animal welfare. The authors also review some of the literature on this topic and discuss the future role of these groups in wildlife care.

Youth, H. 2000. Watching vs. Taking. In: *World Watch*, pp. 12-23.

This article reports on the burgeoning industry of wildlife watching, and suggests why people are drawn to it in increasing numbers. Wildlife watching has become a global phenomenon, and birding in particular has become one of the fastest growing outdoor pastimes. However, people are also branching out into butterfly sightings, and watching other animals such as whales. Very little is known on the motivations of wildlife watchers, although threatened species and biodiversity loss are two suggested reasons. Of further interest is the idea put forward by the biophilia hypothesis that humans harbour an innate affinity for other life forms, and may benefit from an association with them. Furthermore, the world's dominant cultures have become separated from what once sustained them. The growing interest in wildlife is also likely to lead to participation in habitat-saving or species-saving activities, and to a more informed, organised type of watching. The author proposes that all of this interest in other species could ultimately lead to more sustainable human lifestyles. In ensuring that the benefits from wildlife watching tourism remain within the local communities, it encourages communities to welcome other conservation projects and by alleviating poverty it reduces the rates of poaching and deforestation.

Wilderness Therapy

Bennett, L. W., Cardone, S. & Jarczyk, J. 1997. Effects of a Therapeutic Camping Program on Addiction Recovery. *Journal of Substance Abuse Treatment*, **15**, 469-474.

Bennett et al provide an assessment of the Algonquin-Haymarket Relapse Prevention Program in Chicago. Individuals suffering from substance abuse are subjected to three-day outdoor recreation and adventure therapy program integrated with a cognitive-behavioural relapse prevention program, and traditional 12-step addiction recovery activities. Some of the activities focus on the cyclic nature of life and recovery, the interconnectedness of the web of life, and social support systems, and human relations with higher powers (including spirituality, humility, acceptance, and nature). Results of this pilot project suggest that integrating therapeutic recreation/adventure therapy techniques with traditional treatment techniques is more effective in treating substance abusers than traditional treatment alone. For the small sample of early stage recovery participants in this study, (31) results showed that there was a significant reduction in autonomic arousal, frequency of negative thoughts and alcohol cravings in the group receiving traditional as well as adventure therapy. Results also indicated that there was a reduction in the stress levels of this group, but not in the group receiving conventional treatment only. Furthermore, there was a clinically significant improvement in recovery rates for the group receiving the combination of treatments compared to the conventional group. The authors conclude that there is adequate support in these data to encourage further work integrating the principles of adventure therapy into addiction recovery programs, although they suggest that more detailed measures of outcomes are required.

Brand, D. & Smith, M. 1999. Key Elements of a Successful Wilderness Program for Delinquents: A Summary. *Australian Journal of Outdoor Education*, **4**, 40-47.

This article is a review of a wilderness-enhanced model used by various programs run in NSW. The authors find that a well-researched and diligently carried out follow-up program can enable the power of wilderness experiences to form the basis of lasting changes in the attitude and behaviour of participants. The single most important component identified here however, is the leader of such programs. The authors conclude that programs where leaders lack the skills to interact and encourage the participants, no lasting benefits will be achieved.

Cechnicki, A., Bielanska, A. & Walczewski, K. 1999. Therapeutic Camp as a Part of Integrated Community Programme for Schizophrenic Patients. *The International Journal for Therapeutic and Supportive Organisations*, **20**, 113-117.

This study reports on the effectiveness of therapeutic camping for the treatment of patients suffering from schizophrenia. Set in Poland, 78 participants spent two weeks camping in the mountains. The main components of the camp environment are the specific structure of the camp, the activity and availability of therapists, and the ambience and natural habitat.

Crisp, S. 1996. International Models of Best Practice in Wilderness and Adventure Therapy: Implications for Australia. Melbourne: Department of Child, Adolescent and Family Psychiatry, Austin and Repatriation Medical Centre.

The author investigates a number of mental health programs overseas that use wilderness and adventure interventions for treatment of adolescents. The aim of the study is to aid the development of this field in Australia. Programs were investigated in Scotland, the United Kingdom, the United States, and New Zealand. This is a comprehensive and informative report.

Crisp, S. & Auger, N. 1998. Wilderness-Adventure Therapy in Adolescent Psychiatry: A Case Study of a 15-year-old Girl with Psychological and Social Problems. *Australian Journal of Outdoor Education*, **2**, 17-25.

This case study reports on the results of a structured ten-week wilderness therapy program for individuals and groups of teenagers with emotional, behavioural, social, family, and/or psychiatric problems. Named the Brief Intervention Program (BIP), it was established at the Austin Repatriation Medical Centre in Melbourne in 1992 for adolescents between 13-18 years of age. It is a short-term, time limited, intensive psychiatric treatment that tailors interventions to the specific need of participants. A major component of the program is wilderness-adventure therapy. In this case, the subject showed significant psychological and social improvements after an intensive program of wilderness therapy combined with other group therapy approaches. The authors stress the importance of using an integrated approach that combines both traditional and wilderness therapies. This results in a "multi-modal" or holistic approach that is often the most effective

treatment for multi-faceted behavioural or psychological problems. The wilderness therapy component of the program involved bushwalking, abseiling, rockclimbing, caving, and white-water rafting activities (from one to four days duration).

Crisp, S. & O'Donnell, M. 1998. Wilderness-Adventure Therapy in Adolescent Mental Health. *Australian Journal of Outdoor Education*, **3**, 47-57.

Crisp and O'Donnell outline a model of wilderness-adventure therapy based on a comprehensive developmental basis. They provide an overview of developmental and psychodynamic approaches in the treatment of emotional, behavioural, and psychiatric problems in adolescents. The Brief Intervention Program is used to illustrate.

Friese, G.T., Hendee, J. C. & Kinziger, M. 1998. The Wilderness Experience Program WEP Industry in the United States: Characteristics and Dynamics. Idaho: University of Idaho Wilderness Research Center.

Described here are the main characteristics of wilderness experience programs in the United States. The authors contacted more than 700 programs, of which 70% responded. The wilderness experience programs were then classified on the basis of number of trips offered per year, number of clientele served, kind of natural areas used, whether wilderness was considered as "teacher" or "classroom".

Friese, G.T., Pittman, J.T. & Hendee, J. C. 1995. Studies of the Use of Wilderness for Personal Growth, Therapy, Education, and Leadership Development: An Annotation and Evaluation. Idaho: University of Idaho Wilderness Research Center.

Presented as an annotated bibliography, notes are made on 187 pieces of research on the use of wilderness for personal growth, therapy, education, and leadership development. Findings support the belief that participation in wilderness programs results in positive benefits such as enhanced self-esteem. However, the authors conclude that much research in this field is reported in non-peer reviewed outlets and "grey" literature, there is a lack of rigor in the sources of data on which findings are based, and few studies are long-term.

Levitt, L. 1991. Recreation for the Mentally Ill. In: *Benefits of Leisure* (Ed. by Driver, B. L., Brown, L. R. & Peterson, G. L.), pp. 161-177. State College, Pennsylvania: Venture Publishing.

This paper reviews the empirical evidence for the benefits of recreation programs for people suffering from mental illness. It focuses on structured programs only, including: mixed recreation/activities programs consisting of a combination of activities such as art and crafts, walking, games, music and sports; physical exercise programs, primarily jogging or running; and therapeutic camping programs. Considerable focus is dedicated to therapeutic camping programs. A

brief description is given on the nature of the programs, before a discussion on the experimental design and methodology of such programs. This is followed by a discussion of the types of benefits arising from participation in the three types of programs, with some clarification of issues and recommendations for future work in this area. The authors conclude that participation in recreation programs appears to alleviate many symptoms of mental illness, such as depression, anxiety, withdrawal, low self-esteem, disruptive behaviours, and poor interpersonal relationships. They state, however, that much of past research is methodologically flawed (lack of control groups, small biased samples, weak internal validity, biased or confounded results) and that more improved, systematic empirical research is required. They suggest cost-effectiveness analysis be conducted on future programs.

Martin, P. 1996. *New Perspectives of Self, Nature and Others. Australian Journal of Outdoor Education*, **1**, 3-9.

Although written from a personal perspective, this paper addresses an important aspect of exposure to nature, which is the ability for people to experience a more positive attitude towards life and a sense of relatedness or connectedness to something outside of human concerns. The author also raises an important issue that although people may be aware of environmental problems, they only care enough to act upon them when they personally feel connected to the natural areas under threat. This can only come from direct experience of, or contact with, those environments.

McDonald, B. L., Guldin, R. & Wetherhill, R. G. 1988. *The Spirit in the Wilderness: The Use and Opportunity of Wilderness Experience for Spiritual Growth*. In: *Wilderness Benchmark 1988: Proceedings of the National Wilderness Colloquium* (Ed. by Freilich, H. R.), pp. 193-207. Tampa, Florida: Southeastern Forest Experiment Station, Forest Service, US Department of Agriculture.

Spiritual growth as a motivation for, or value of, wilderness has not been widely researched. A paradigm does not currently exist to examine the appropriateness of an area for such growth. The authors examine wilderness experience in four categories: sacred places and things; cultural heritage; organised groups; and individual experiences. The value of spiritual growth is presented in expanding spheres of community benefits, indicating personal and social value, and possibly biocentric value. Management challenges are also presented. McDonald et al conclude that while spiritual growth is subjective, there are indications that management guidelines could be developed to enhance the opportunity for spiritual growth.

Reddrop, S. 1997. *Outdoor Programs for Young Offenders in Detention: An Overview*. Hobart: National Clearinghouse for Youth Studies.

As stated in the preface, this document was written with the purpose of codifying miscellaneous literature on outdoor programs for young offenders in a detention centre context. Most of the literature included focuses on extended wilderness trek experiences in the style of Outward Bound. Issues covered include: the

definition of an outdoor program; evidentiary findings of research; limitations of this research; a summary of the proposed benefits of outdoor programming for young offenders; a compilation of the most recommended components of outdoor programs; some models and strategies exploring how to actually conduct various outdoor programs for young offenders; a discussion of adapted outdoor programs for special populations of young offenders; examples of Australian programs for offenders; and lastly a look at methods of evaluation. Although the programs discussed here are specifically tailored to young offenders, many of the issues covered by this text and the analysis of program components relate to other, more general wilderness type programs, as well as those targeting youth with psychological and/or behavioural problems.

Russell, K. C., Hendee, J. C. & Hall, L. 1996. A Wilderness Discovery Program for Urban Youth at Risk at the Atlanta Job Corps Center. In: *Wilderness Areas in the East Conference*. Gatlinburg, Tennessee: University of Idaho Wilderness Research Center.

This article documents the findings of a seven-day Wilderness Discovery program specifically designed for youth-at-risk in the Federal Job Corps of the United States. The aims of the program were to enhance self-esteem, cooperation, and social skills to support their ongoing education and job training undertaken through the Job Corps.

Russell, K. C., Hendee, J. C. & Cooke, S. 1996. Social and Economic Benefits of a Wilderness Experience Program for Youth at Risk in the Federal Job Corps. Idaho: University of Idaho Wilderness Research Center.

Russell et al report on the Wilderness Discovery program in terms of social and economic benefits to society at large. Job Corps states that for every dollar spent on its programs, US\$1.46 is returned to society in the form of net social benefits. This study reports on a similar cost/benefits analysis done when the wilderness component is added to Job Corps activities via the Wilderness Discovery program. Results suggest that the Wilderness Discovery program generated benefits twice as great as the variable costs of operating the program.

Russell, K. C., Hendee, J. C. & Phillips-Miller, D. 1999. How Wilderness Therapy Works: An Examination of the Wilderness Therapy Process to Treat Adolescents with Behavioural Problems and Addictions. In: *Wilderness Science in a Time of Change* (Ed. by Cole, D. N. & McCool, S. F.). Odgen, UT: Department of Agriculture, Forest Service, Rocky Mountain Research Station.

This paper provides a comprehensive definition of wilderness therapy, and develops an applied model by interviewing staff from four leading wilderness therapy programs in the United States. They state that the wilderness therapy process is characterised by a cleansing phase, a personal and social responsibility phase, and a transition and aftercare phase. They conclude that the emergence of wilderness therapy demonstrates the value of wilderness as a healing source for adolescents who are not being reached by traditional therapeutic techniques.

Thompson, C. 2001. Stress and Renewal Associated With Time Spent Bushwalking. *Thesis submitted for Postgraduate Diploma of Psychology* pp.1-37. Melbourne: Monash University, Department of Psychology.

This thesis investigates the effect of bushwalking and self-reported connectedness to nature on the stresses experienced in daily life. Although findings did not indicate that bushwalkers (i.e. participants who had spent ten days or more in the bush in the last 12 months) experienced greater wellbeing than non-bushwalkers (i.e. participants who had spent six days or less in the bush in the last 12 months), results suggested that an individual's subjective view of their connectedness to nature had a significant effect on their wellbeing.

Biophilia

Frumkin, H. 2001. Beyond Toxicity Human Health and the Natural Environment. *American Journal of Preventative Medicine*, **20**, 234-240.

According to E.O. Wilson's "biophilia" hypothesis, humans are innately attracted to other living organisms. Later authors have expanded this concept to suggest that humans have an innate bond with nature more generally. Evidence supporting this is presented from four aspects of the natural world: animals, plants, landscapes and wilderness. The author strongly advocates a new, collaborative approach to public health incorporating the work of environmental health specialists, researchers, and clinicians. Yet, further work is required to determine key aspects of the natural environment that enhance health. This article provides a succinct and accurate analysis of the current and potential contribution of the natural environment to human health.

Gullone, E. 2000. The Biophilia Hypothesis and Life in the 21st Century: Increasing Mental Health or Increasing Pathology? *Journal of Happiness Studies*, **1**, 293-321.

One area of support for the innate human tendency for life and lifelike processes proposed by the biophilia hypothesis comes from research demonstrating increased psychological well-being upon exposure to natural features and environments. Given that modern ways of living are in stark contrast to our evolutionary history, this paper proposes that humans may currently be witnessing the beginnings of significant adverse outcomes for the human psyche.

Kahn, P.H.J. 1999. *The Human Relationship with Nature: Development and Culture*. Cambridge Massachusetts, London England: The MIT Press.

This book documents significant research conducted by the author on the human relationship with nature, and how this relationship develops. By studying children and young adults in diverse locations ranging from an economically impoverished black neighbourhood in Houston, Texas to a remote village in the Brazilian Amazon, this research attempts to answer questions such as How do people value nature and morally reason about its preservation? Do children have a deep connection to the natural world, which in time is severed by modern society? Or do such connections emerge, if at all, in adolescence or later, and perhaps require increased cognitive capacities and moral sensibilities? The author also provides detailed discussion of evidence for and against the biophilia hypothesis.

Kellert, S. R. 1993. The Biological Basis for Human Values of Nature. In: *The Biophilia Hypothesis* (Ed. by Kellert, S. R. & Wilson, E. O.), pp. 42-69. Washington, D.C.: Shearwater Books/Island Press.

This chapter explores the biophilia hypothesis by examining nine fundamental aspects of the human species' presumably biological basis for valuing and affiliating with the natural world. The author refers to these tendencies as a cluster of learning rules rather than instincts, and groups them under the headings: utilitarian; naturalistic; ecologicistic-scientific; aesthetic; symbolic; humanistic; moralistic; dominionistic; and negativistic valuations of nature.

Kellert, S. R. 1997. *Kinship to Mastery: Biophilia in Human Evolution and Development*. Washington, D.C.: Island Press.

Here, Kellert discusses the biophilia hypothesis, or the human need to affiliate with nature, and its influence on human physical and psychological development. The text is an exploration of this concept and an attempt to qualify the notion of an inherent inclination to affiliate with nature and life.

Kellert, S. R. & Wilson, E. O. 1993. *The Biophilia Hypothesis*. Washington, D.C.: Shearwater Books/Island Press.

This book is a collection of writings on the concept of biophilia. Built on several decades of work, it covers various topics, including: the role of nature in human cognitive and mental development; the biological basis for diverse values of nature; the evolutionary significance of the human aesthetic response to varying landscapes and species; the sociobiological importance of human altruism and helping behaviour; and the role of nature in human emotional bonding and physical healing.

Orr, D. W. 1993. Love It or Loose It: The Coming Biophilia Revolution. In: *The Biophilia Hypothesis* (Ed. by Kellert, S. R. & Wilson, E. O.), pp. 425-440. Washington, D. C.: Shearwater Books/Island Press.

Provided here is an eloquent discussion about modern humanity's relationship with nature, and its consequences for psychological health. The author highlights the fact that individuals are not necessarily born with biophilic tendencies, but they are strongly determined by education, experience, and childhood development. However, Orr emphasises the importance of biophilia in addressing the current environmental crisis and that modern humans must transform how they relate to the natural environment.

Ulrich, R. S. 1993. Biophilia, Biophobia, and Natural Landscapes. In: *The Biophilia Hypothesis* (Ed. by Kellert, S. R. & Wilson, E. O.), pp. 73-137. Washington, D.C.: Shearwater Books/Island Press.

This chapter examines the biophilia hypothesis in the context of theory and empirical findings relating to psychological, physiological, and certain health-related responses associated with viewing natural landscapes. Much of the discussion focuses on people's visual experiences with nature, such as landscapes and vegetation rather than animals.

Wilson, E. O. 1984. *Biophilia*. Cambridge, Mass.: Harvard University Press.

In his now famous book, Wilson documents the development of the biophilia hypothesis to understand the human tendency to relate to other life forms and natural processes. Here, biophilia is defined and discussed from an evolutionary perspective, while the author takes the reader on a personal and descriptive journey, with many examples to illustrate.

Ecopsychology

Barkow, J. H., Cosmides, L. & Tooby, J. 1992. *The Adapted Mind - Evolutionary Psychology and the Generation of Culture*. New York: Oxford University Press.

The Adapted Mind is an edited volume of original papers centered on the complex, evolved psychological mechanisms that generate human behaviour and culture. The authors state that this text has two goals: to introduce the newly formed field of evolutionary psychology to a wider scientific audience; and secondly, to clarify how this field, by focussing on the evolved information-processing mechanisms that comprise the human mind, supplies the necessary connection between evolutionary biology and complex social and cultural phenomena.

Burns, G. W. 1998. *Nature-Guided Therapy - Brief Integrative Strategies for Health & Well-being*. Philadelphia: Brunner/Mazel.

The unconventional psychoanalytical approach adopted by this practising psychologist is documented in this informative and practical text. Burns provides a comprehensive discussion on the historic, evolutionary, and theoretical aspects of the human relationship with nature, before providing details of specific, practical, nature-based therapy (involving contact with nature) that he has found to be successful in treating a range of patients, including those suffering from depression and stress, to those with relationship difficulties. Many examples are provided.

Burns, G. W. 1999. Nature-Guided Therapy: A Case Example of Ecopsychology in Clinical Practice. *Australian Journal of Outdoor Education*, **3**, 9-14.

The author states that nature-guided therapy is about using the restorative and recuperative powers of nature to achieve clinical goals of health and wellbeing. Here he describes one case example to illustrate some of the therapeutic interventions that can be used in nature-guided therapy. A good review of the literature is included and the author presents a convincing case as to the healing powers of nature.

Cumes, D. 1998. Nature as Medicine: The Healing Power of Wilderness. *Alternative Therapies*, **4**, 79-86.

This article explores the idea that wilderness is an effective form of healing by allowing access to the higher self. This achieved by of transcendence of the ego. Evidence is presented from the literature and a detailed discussion of the lifestyle of the indigenous people of the Kalahari Desert (the San Hunter-Gatherers) is provided by means of example. Cumes also defines deeper experiences felt by humans in wilderness areas as "wilderness rapture". Wilderness rapture is shown to bring about inner peace, and enhance spiritual and psychological health.

Roszak, T., Gomes, M. E. & Kanner, A. D. 1995. *Ecopsychology: Restoring the Earth, Healing the Mind*. San Francisco: Sierra Club Books.

This text is a collection of articles about ecopsychology, a specialist branch of psychology designed to heal the fundamental alienation between humans and the natural environment predominant in Western lifestyles. Ecopsychology also encompasses the human-nature relationship, and examines the role of nature in human health and wellbeing. The book is divided into two sections; the first presents some theoretical perspectives; and the second discusses ecopsychology in practice.

Schroeder, H. 1996. Psyche, Nature, and Mystery: Some Psychological Perspectives on the Values of Natural Environments. In: *Nature and the Human Spirit: Toward an Expanded Land Management Ethic* (Ed. by Driver, B. L., Dustin, D., Baltic, T., Elsner, G. & Peterson, G. L.), pp. 81-96. State College, PA: Venture Publishing, Inc.

Here, Schroeder provides a general, historical overview of some approaches to psychology and discusses the implications for nature and the human spirit. Also explored, are some specific psychological perspectives useful in understanding the spiritual values and experiences attributed to nature. This chapter is particularly useful for those with limited knowledge of psychology.

Human Ecology

Boyden, S. 1992. *Biohistory: The Interplay Between Human Society and the Biosphere*. Paris: UNESCO Paris & The Parthenon Publishing Group.

Part of the Man and the Biosphere Book Series published by UNESCO, this book provides an overview of biohistory – the broad sequence of happenings in the history of the biosphere and of civilisation. The focus is on the interplay of human culture, society, natural processes, and biophysical systems.

Boyden, S. & Shirlow, M. 1989. Ecological Sustainability and the Quality of Life. In: *2020: A Sustainable Healthy Future - Towards an Ecology of Health*, pp. 31-42. Melbourne: La Trobe University and The Commission For The Future.

This paper applies biohistory, the study of human situations in the history of life on earth, to questions of future survival and wellbeing of humanity. Conclusions are drawn that the previous four ecological phases (hunter-gatherers, farming, urban, and high-energy) will be replaced by a fifth. This fifth phase will see a return to ecological balance between human systems, the biosphere, and human evolutionary history. Four biosocial imperatives are discussed and a conceptual phase for the fifth phase is developed with the objective of achieving the goal of healthy people in a healthy biosphere.

Heerwagen, J. H. & Orians, G. H. 1993. Humans, Habitats, and Aesthetics. In: *The Biophilia Hypothesis* (Ed. by Kellert, S. R. & Wilson, E. O.), pp. 138-172. Washington, D.C.: Shearwater Books/Island Press.

The authors examine human responses to landscapes from an adaptive problem-solving perspective. Human ancestors had to know how to interpret signals from the animate and inanimate environments and how to adjust their behavioural response to the context at hand; their survival, health, and reproductive success depended on their ability to seek and use environmental information wisely. A detailed discussion from an evolutionary perspective is provided on humans and habitat choice, and the adaptation of humans to their environment. This is placed in the context of modern humans' current destructive attitude towards the environment.

Kahn, P. H., Jr & Kellert, S. R. 2002. *Children and Nature: Psychological, Sociocultural, and Evolutionary Investigations*. Cambridge, Massachusetts: The MIT Press.

This collection of work incorporates research from cognitive science, developmental psychology, ecology, education, environmental studies, evolutionary psychology, political science, primatology, psychiatry, and social psychology. The authors examine the evolutionary significance of nature during childhood; the formation of children's conceptions, values, sympathies toward the

natural world; how contact with nature affects children's physical and mental development; and the educational and political consequences of the weakened childhood experience of nature in modern society.

Orians, G. H. & Heerwagen, J. H. 1992. Evolved Responses to Landscapes. In: *The Adapted Mind - Evolutionary Psychology and the Generation of Culture* (Ed. by Barkow, J. H., Cosmides, L. & Tooby, J.), pp. 555-579. New York: Oxford University Press.

The authors have studied human responses to landscapes in terms of examining the evolution of aesthetic tastes. In this paper, they look at the evolution of human habitat selection and the role it plays in modern landscape preferences, and how it affects human emotions and wellbeing. In their discussion, they cover a number of theories to explain human habitat preferences, and advocate an evolutionary-adaptive approach as an enriching means to study environmental aesthetics.

Williams, D. R., Haggard, L. M. & Schreyer, R. 1988. The Role of Wilderness in Human Development. In: *Wilderness Benchmark 1988: Proceedings of the National Wilderness Colloquium*, pp. 169-180. Tampa, Florida: Southeastern Forest Experiment Station, Forest Service, US Department of Agriculture.

The focus of this paper is to characterise the human development functions of wilderness as the result of individuals actively seeking self-definition. Because wilderness is a rich source of personal, national/cultural and biological identity information, it plays a significant and valuable role in self-definition on all three levels of human functioning.

Ecological Theory of Health

Capra, F. 1999. *Ecoliteracy: The Challenge for Education in the Next Century*. pp. 1-10. Berkeley: Center for Ecoliteracy.

Capra has developed the concept of “ecoliteracy”, which is an understanding of the principles of organisation that ecosystems have developed to sustain the web of life. Having established the Center for Ecoliteracy in Berkeley, California, which is dedicated to fostering the experience and understanding of the natural world in primary education, Capra hopes that children both now and in the future will become ecoliterate. Ecoliterate is defined as understanding the basic principles of ecology and being able to embody them in the daily life of human communities. The author states that the Earth is our common home, and creating a sustainable world for all children, and future generations, is a task common to all of humanity.

Capra, F. 1994. *Ecology and Community*. pp. 1-10. Berkeley: Center for Ecoliteracy.

In this article, Capra superimposes the concept of community on an ecological framework. A sustainable community is defined as social and cultural environments in which humans can satisfy their needs without diminishing the chances of future generations. He uses the illustration of ecosystems, which are literally sustainable communities of plants, animals, and microorganisms. Ecosystems are discussed in terms of interdependence, recycling, partnership, flexibility, and diversity, which together result in sustainability.

Brown, V. A. 1996. *Double or Nothing: The Changing Relationship Between the Health of the Biosphere and the Health of the People*. In: *Survival, Health and Wellbeing into the Twenty First Century - Proceedings of a Conference Held at The Australian National University, November 30 - December 1, 1995* (Ed. by Furnass, B., Whyte, J., Harris, J. & Baker, A.), pp. 59-67. Canberra: Nature & Society Forum.

Brown examines how perspectives on the relationship between human health and the environment have changed over the last few centuries, and into the next. She examines a number methods of prediction used to assess the risks of our current attitude towards health and the environment. Methods include: extension of existing trends; scenarios built up from current case studies; and integration of all current evidence. The conclusion boldly states that in terms of the health of both people and the environment, “we are in the midst of a global gamble”, and unless sustainability is supported, we will have neither

Chu, C. & Simpson, R. 1994. *Ecological Public Health: From Vision to Practice*. Nathan: Institute of Applied Environmental Research, Griffith University, Queensland, Australia and Centre for Health Promotion, University of Toronto, Canada.

This book is the result of a conference and workshop on integrating health and the environment held in Canberra in 1990. Participants were from a wide variety of health and environmental professions. Three major strategies for ecological public health were addressed: investing where health is created; assessing which strategy provides the largest health gain; ensuring that the approaches chosen help close health gaps and protect human rights. A major theme underlying this document is sustainability and protection of the natural environment.

Hancock, T. 2000. Healthy Communities Must Also Be Sustainable Communities. *Public Health Reports*, **115**, 151-156.

In this article, the author argues that healthy communities must be both environmentally and socially sustainable. His reasoning is based on the fact that health depends on the quality of the built and natural environments, and that global change arising from the industrial economy is affecting the web of life beyond repair.

Hancock, T. 1999. Healthy and Sustainable Communities - Creating Community Capital. In: *4th European IUHPE Conference on Effectiveness and Quality of Health Promotion*. Estonia: IUHPE.

Here Hancock focuses on the connections between healthy and sustainable communities and the environment on which they rely. The importance of the environment for human health is a key focus of this paper, Hancock advocates the healthy community approach based on a model he developed earlier (1993) comprised of overlapping spheres of community, environment, and economy. In this article, he also refers to the four capitals model as a means of measuring national wealth.

Hancock, T. 1994. Sustainability, Equity, Peace and the (Green) Politics of Health. In: *Ecological Public Health: From Vision to Practice* (Ed. by Chu, C. & Simpson, R.). Nathan: Institute of Applied Environmental Research, Griffith University, Queensland Australia and Centre for Health Promotion, Ontario Canada.

In the introduction to this article, Hancock states that the fundamental prerequisites of health can be considered in relation to the basic principles of sustainability, equity, and peace. He discusses each of these principles in turn and then turns his attention to health and economics, the true economics of health, and ecological politics.

Hancock, T. & Perkins, F. 1985. The Mandala of Health: A conceptual Model and Teaching Tool. *Health Education*, **Summer**, 8-10.

Hancock and Perkins developed the Mandala of Health, which they describe as a biopsychosocio-environmental model of health. Here they explain the model and describe its use for examining a wide variety of public health issues, including human ecology, community development, education, promotion and advocacy, the role of the medical system, and public health principles.

Kickbusch, I. 1989. Good Planets Are Hard to Find: Approaches to an Ecological Base for Public Health. In: *2020: A Sustainable Healthy Future, Towards an Ecology of Health* (Ed. by La Trobe University & Commission for the Future), pp. 7-30. Melbourne: La Trobe University & Commission for the Future.

In this article Kickbusch expands on the concept of an ecological approach to health and maintains that health should be understood as a pattern of relations rather than a quantitative outcome. She also advocates a revision of our current use of resources (termed the "sewerage principle") to a more sustainable model (an ecological approach). The theoretical base for an ecological model of health is discussed, along with some strategies and approaches.

La Trobe University & The Commission for the Future. 1989. Proceedings of Workshop 2020: A Sustainable Healthy Future - Towards an Ecology of Health. Melbourne: La Trobe University & The Commission for the Future.

This publication contains some of the key papers from the workshop held in 1989. The purpose of the workshop was to use projection techniques to develop realistic scenarios of the quality of life in Australia one generation from the time of publication. Outcomes of the workshop included development of criteria for an ecological public health, a series of recommendations, and the establishment of some Australian National health goals.

Labonte, R. 1993. A Holosphere of Healthy and Sustainable Communities. *Australian Journal of Public Health*, **17**, 4-12.

Public health practice is in a transitory state, expanding beyond medical and behavioural models of health and disease to encompass physical and social environmental health determinants. The "Holosphere" Framework locates health as its central metaphor, and defines six interacting environmental spheres: a viable natural environment, a sustainable economic environment, a sufficient economy, an equitable social environment, a convivial community, and a liveable built environment. Representative actions from each of these spheres are identified and discussed using the five functional roles of local government.

Labonte, R. 1994. *Econology: Health and Sustainable Development*. In: *Ecological Public Health: From Vision to Practice* (Ed. by Chu, C. & Simpson, R.), pp. 19-35. Nathan: Institute of Applied Environmental Research, Griffith University, Queensland Australia and Centre for Health Promotion, University of Toronto, Canada.

Labonte reviews basic concepts in sustainable development and examines their health implications using the following relationships: health and the environment; health and the economy; economy and the environment. Also explored are twelve principles that can be used to guide sustainable development. He concludes by discussing how the criteria of the “new” public health and sustainable development overlap.

Montes, S. 1996. *Uses of Natural Settings to Promote, Maintain, and Restore Human Health*. In: *Nature and the Human Spirit: Toward an Expanded Land Management Ethic* (Ed. by Driver, B. L., Dustin, D., Baltic, T., Elsner, G. & Peterson, G. L.), pp. 105-118. State College, PA: Venture Publishing, Inc.

This work discusses the health values of nature in terms of health promotion. Although broad, it gives a neat overview of the literature documenting the health and wellbeing benefits of nature, with a focus on psychological and spiritual aspects. The author has set her discussion in the context of current health trends, and provides a comparison of western and complementary and alternative medicine.

Raphael, B., & Martinek, N. 1996. *Psychosocial Wellbeing and Mental Health into the 21st Century*. In: *Survival, Health and Wellbeing into the Twenty First Century - Proceedings of a Conference Held at The Australian National University, November 30 - December 1, 1995* (Ed. by Furnass, B., Whyte, J., Harris, J. & Baker, A.), pp. 31-46. Canberra: Nature & Society Forum.

In this comprehensive article the authors describe a number of social, ecological, and technological processes likely to affect mental health and wellbeing in the 21st Century. Divided into two parts, part one presents a discussion of some of these processes, including: population growth and mental health and wellbeing; ecological change and psychological wellbeing; nationalism, ethnic conflicts, fundamentalism, and ideologies of exclusion; and dislocation, migration and refugees. Part two covers issues such as: globalisation, the health of developing countries, and the underclasses; powerlessness and control: their relation to health and wellbeing; social and behavioural epidemics and epidemiology, and factors affecting the next generation.

VanLeeuwen, J. A., Waltner-Toews, D., Abernathy, T. & Smit, B. 1999. *Evolving Models of Human Health Toward an Ecosystem Context*. *Ecosystem Health*, **5**, 204-219.

This paper states that current models or frameworks used to represent and/or conduct research on determinants of health have lagged behind in adopting emerging concepts of ecosystems, including: multiple spatial and temporal scales;

nested hierarchies of socio-economic and biophysical environments; inherent complexity of interrelationships among environmental components and influences; external environmental influences; and feedback loops between environments, providing self-organisational capacity, and functional emergent properties. The article provides a concise description of a number of human health models and their relevance to an ecosystem health context. A new model of health is proposed, the “Butterfly Model of Health” that draws on the strengths of previous health models, but more fully incorporates salient characteristics of ecosystems.

World Health Organization. 1986. Ottawa Charter for Health Promotion. In: *International Conference on Health Promotion: The Move Towards a New Public Health*. Ottawa: World Health Organization, Health and Welfare Canada, Canadian Public Health Association.

This charter is the product of the first International Conference on Health Promotion. It was a response to growing expectations for a new public health movement around the world. Discussions focussed primarily on the needs in industrialised countries, but took into account similar concerns in other regions. It is widely referred to, particularly in relation to its advocacy of creating environments supportive of health. That is, a recognition of the inextricable links between people and their environment that constitutes a socio-ecological approach to health.

Social Capital, The Environment, & Health

Baum, F. 1999. The Role of Social Capital in Health Promotion: Australian Perspectives. *Health Promotion Journal of Australia*, **9**, 171-178.

This article addresses the issue of an assessment of the implication of theories of and empirical data about social capital on health promotion policy and practice in Australia. The literature is examined, followed by a discussion of empirical data from the Adelaide Health Development and Social Capital Project. Baum concludes that social capital undoubtedly has a crucial role in health promotion, but this role will only be effective if it is seen as part of a broader project to reduce inequities in society and promote material wellbeing.

Cattell, V. 2001. Poor People, Poor Places, and Poor Health: The Mediating Role of Social Networks and Social Capital. *Social Science and Medicine*, **52**, 1501.

This paper explores the dynamics between poverty and exclusion, neighbourhood, and health and wellbeing by considering the role of social networks and social capital. Qualitative research was conducted in two deprived neighbourhoods, involving in-depth interviews with residents. The role of three factors in influencing social networks and social capital are demonstrated:

neighbourhood characteristics and perceptions; poverty and social exclusion; and social consciousness. Although participation in organisations was confirmed as beneficial, it is suggested that neighbourhoods also require regenerated local work opportunities to develop bridging ties necessary for the creation of inclusive social capital and better health.

Flora, J. L. 1998. Social Capital and Communities of Place. *Rural Sociology*, **63**, 481-506.

Flora develops a framework for examining a series of questions, including: does social capital make a difference for wellbeing in communities of place? And how might rural sociologists utilise social capital to further wellbeing in such communities? Although rather theoretical, this paper is likely to be of interest to those wanting to delve into the theory behind social capital and its application.

Gleeson, D. 1999. Social Capital Theory: Implications for Public Health. *Health Promotion Journal of Australia*, **9**, 183-187.

This paper examines the theoretical foundations of social capital and suggests some implications for public health policy-making and research. An overview of the origins of social capital is presented and comparisons made between two key theories. Gleeson concludes that public health practitioners using the concept of social capital need to understand the world views that are embedded in different perspectives, and the implications in terms of rhetorical value, insights into social determinants of health, and measurability.

Glover, S., Burns, J., Butler, H. & Patton, G. C. 1998. Social Environments and the Emotional Wellbeing of Young People. *Family Matters*, **49**, 11-16.

There are growing concerns about current rates of adolescent depression and youth suicide. This article discusses the work of the Centre for Adolescent Health's Gatehouse Project, which highlights the significance of social environments on young people's mental health and outlines school-based approaches to the promotion of emotional wellbeing. The framework proposed has relevance to other settings and challenges us to consider how we might extend preventive action across the community.

Hawe, P. & Shiell, A. 2000. Social Capital and Health Promotion: A Review. *Social Science and Medicine*, **51**, 871-885.

In this paper, the authors present a brief history of social capital and how it has come into recent prominence through the debate linking income inequality and health. This paper reviews the background literature to this, on social environmental influences and health and the possible processes thought to underlie this relationship. Social capital has material, relational, and political aspects, however, the authors state that although the relational aspects of social capital are important, the political aspects are perhaps under recognised. Hawe and Shiell suggest that social capital research has inadequately captured the

underlying constructs. They conclude that now is the time when many fields are coming together in attempts to solve complex problems. Although somewhat theoretical, this paper has value in promoting the importance of a holistic or multidisciplinary approach when dealing with complex societal problems such as the link between social inequalities and health.

House, J. S., Landis, K. R. & Umberson, D. 1988. Social Relationships and Health. *Science*, **241**, 540-544.

Recent scientific work has established both a theoretical basis and strong empirical evidence for a causal impact of social relationships on health. Prospective studies, which control for baseline health status, consistently show increased risk of death among persons with a low quantity, and sometimes low quality, of social relationships. Experimental and quasi-experimental studies of humans and animals also suggest that social isolation is a major risk factor for mortality from widely varying causes. The mechanisms through which social relationships affect health and the factors that promote or inhibit the development and maintenance of social relationships remain to be explored.

Kawachi, I. & Kennedy, B. 1997. Socioeconomic Determinants of Health: Health and Social Cohesion. Why Care About Income Inequality? *British Medical Journal*, **314**, 1037-1040.

The lack of a wider income distribution, or social cohesions, will impact the health of all in a given society. As wealthier groups become more concerned about protecting their privilege in separate residential areas, middle-class and poor people are confronting the effects of lower income, unsafe neighbourhoods, more crime, and low quality schools. Future citizens with substandard education and lack of skills will undermine the economic and social aspects of society and ultimately the political fabric of life. The extent of income inequality in society is often a consequence of explicit policies and public choice. Reducing income inequality offers the prospect of greater social cohesiveness and better population health.

Leeder, S. & Dominello, A. 1999. Social Capital and its Relevance to Health and Family Policy. *Australian and New Zealand Journal of Public Health*, **23**, 424-429.

Leeder and Dominello discuss the risks associated with relying on social capital to capture fully the subtle interplay of individuals and society essential for health and wellbeing. They state that it is important to be clear about the nature of the social context in which we operate and in which the association between society and health is to be explored. The authors believe that while social capital is an arresting term, its ambiguity limits its broad applicability at present and shields it from easy study. They concede however, that if we are prepared to unpack it and reduce it to measurable and knowable elements, then it may serve well in discerning ways of steering society through effective, reflective, and human social policy toward better health and family wellbeing.

Pretty, J. & Frank, B. R. 2000. Participation and Social Capital Formation in Natural Resource Management: Achievements and Lessons. In: *International Landcare 2000 Conference*. Melbourne, Australia.

Pretty and Frank discuss the roles of social and human capital in producing positive environmental outcomes. Although their discussion focuses on social capital, they also discuss all five types of capital: natural, social, human, physical, and financial. This article is useful from the point of view that the links between the social and natural environment, and social and natural capital, are acknowledged.

Pretty, J. & Ward, H. 2001. Social Capital and the Environment. *World Development*, **29**, 209-227.

In this paper, Pretty and Ward link social and human capital formation in rural communities with improvement in natural capital. A review of relevant theoretical literature is included, bringing together evidence from case studies not previously compiled. The authors demonstrate how human and social capital have been central to equitable and sustainable solutions to local development problems.

Putnam, R. D. 1995. Bowling Alone: America's Declining Social Capital. *Journal of Democracy*, **6**, 65-78.

In this oft-quoted article, Putnam uses the central premise that social connections and civic engagement pervasively influence our public life as well as our private prospects, as a starting point for an empirical survey of trends in social capital in contemporary America. Putnam concentrates entirely on the American case, although as he states, the developments he portrays may capture the situation in many contemporary societies. He discusses why social capital in the U.S. is eroding and presents some solutions as to what may be done. Among other reasons for social capital's decline, Putnam lists the technological transformation of leisure; the "privatising" or "individualising" of leisure is disrupting many opportunities for social-capital formation.

Runyan, D. K., Hunter, W. M., Socolar, R. R. S., Amaya-Jackson, L., English, D., Landsverk, J., Dubowitz, H., Browne, D. H., Bangdiwala, S. I. & Mathew, R. M. 1998. Children Who Prosper in Unfavourable Environments: The Relationship to Social Capital. *Pediatrics*, **101**, 12-19.

In this article, social capital is defined as the benefits derived from personal relationships (within families and communities) and social affiliations. The investigation described here examined the extent to which social capital is associated with positive developmental and behavioural outcomes in high-risk preschool children. A cross-sectional case-control analysis of young children "doing well" and "not doing well" at baseline in four coordinated longitudinal studies was the basis of the design. A total of 667 high-risk preschool children were assessed for behavioural, emotional, and developmental problems. These scores were compared to an assessment of the children's social capital, as defined

by five specific characteristics. Only 13% of the children were found to be doing well overall, and this was strongly associated with positive social capital scores, compared to those children considered to be not doing well. Findings suggest that social capital may have an impact on children's wellbeing as early as the preschool years. In these years it seems to be the parents' social capital that confers benefits on their offspring, just as children benefit from their parents' financial and human capital. Social capital may be most crucial for families who have fewer educational and financial resources. The authors conclude that for the healthy development of children, particularly those most at risk for poor developmental outcomes, new and creative ways of supporting interpersonal relationships and strengthening communities in which families carry out the daily activities of their lives must be developed.