



VISITOR LEARNING IN ZOOS, AQUARIUMS, ECO AND WILDLIFE TOURISM EXPERIENCES

**Visitor Research Unit
Publications 2005 – 2017**



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ABOUT THE VISITOR RESEARCH GROUP

The Visitor Research Group at the University of Queensland, Australia is dedicated to understanding visitors' needs, experiences and behaviours. Much of our work has concentrated on research in zoos, aquariums and other wildlife tourism sites, with the aim of improving the capacity to positively impact visitors' conservation learning and environmental behaviour. The annotated bibliography presented here summarises research findings from a wide range of projects in zoos, aquariums and other wildlife tourism sites in Australia, Canada, New Zealand, South Africa, and the USA. The papers present research findings in the field and suggestions for the design of effective learning experiences that have a positive impact on visitors' environmental understanding, attitudes and behaviour.

It is hoped that the lessons learned from this research will be useful in shaping and informing future research programs, as well as underpinning the design of effective, evidence-based conservation education initiatives. The papers should be of interest to both researchers and practitioners working in zoos, aquariums and other wildlife tourism sites.

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Please contact Dr Jan Packer (j.packer@uq.edu.au) or Professor Roy Ballantyne (r.ballantyne@uq.edu.au) for access to any of these papers.

VISITOR RESEARCH TEAM

Professor Roy Ballantyne

Professor Roy Ballantyne has a well-established international reputation for his work in environmental/heritage interpretation and visitor research. He has published widely and been successful in attracting many research, consultancy and teaching development grants worth around \$5.7 million (including 9 Australian Research Council Grants). His current research focuses on environmental learning in free-choice learning environments with an emphasis on facilitating visitors' adoption of environmentally sustainable behaviour. He was awarded the Australian National Teaching Fellowship for 1997-8.



Associate Professor Jan Packer

Associate Professor Jan Packer has a background in Psychology having completed a BA (Hons) at UQ in 1976. Her PhD (Education, QUT, 2004) focussed on motivations for learning in educational leisure settings. She has published broadly in the area of educational psychology over many years. The current major focus of her research is in applying the principles of educational, environmental and positive psychology to understand and facilitate visitor experiences in leisure settings such as museums and other tourist and leisure contexts. Jan was co-editor (together with Roy Ballantyne) of the international journal, *Visitor Studies* from 2005 through 2011.



Dr Karen Hughes

Dr Karen Hughes currently lectures at undergraduate and postgraduate level in the areas of sustainable tourism and visitor management. Her research interests include interpretation and environmental education, wildlife tourism, heritage tourism, visitor behaviour and



sustainable tourism. She is particularly interested in exploring how interpretation can be used across a range of contexts to attract, engage and inspire visitors. Karen's PhD focused on designing and evaluating the impact of interpretive resources on families' adoption of environmental behaviours following a visit to Mon Repos turtle rookery. She has over 20 years of tourism research experience, and has also been a lecturer and researcher at James Cook University, Charles Darwin University and Queensland University of Technology.

Dr Judy Mann - Lang

Dr Judy Mann-Lang is the Conservation Strategist for the South African Association for Marine Biological Research. With a passion for the oceans, she has worked in the aquarium field for over 20 years. She has a PhD from the University of Queensland Business School.



Her research on visitor learning in zoos and aquariums focuses on improving the effectiveness of conservation communication, with a special emphasis on the influence of cultural variables.

VISITORS' ENVIRONMENTAL LEARNING IN WILDLIFE TOURISM SETTINGS

Ballantyne, R., & Packer, J. (2005). Promoting environmentally sustainable attitudes and behaviour through free-choice learning experiences: What's the state of the game?.

In Environmental Education Research, 11(3), 281-295.

Environmental education, both in and outside of the classroom, aims to facilitate school students' and the general public's adoption of sustainable practice. This paper explores the role of free-choice learning experiences in this regard. An overview of theoretical approaches underpinning free-choice learning research is provided, examples are presented of the ways in which informal educational settings can promote environmentally sustainable attitudes and behaviour, and the factors contributing to the effectiveness of these endeavours are discussed. By reviewing research evidence in relation to these issues, the paper identifies the current 'state of the game' and areas where new research is needed.

Ballantyne, R., Packer, J., Hughes, K., & Dierking, L.D. (2007). Conservation learning in wildlife tourism settings: lessons from research in zoos and aquariums.

In Environmental Education Research, 13(3), 367-383.

Zoos and aquariums have shifted their focus over recent years, taking a much more active role in wildlife conservation and in promoting conservation learning among their visitors. Research in these settings provides a valuable foundation for the emerging field of non-captive wildlife tourism. In particular, valuable lessons regarding the potential impact of wildlife encounters on visitors' conservation attitudes and behaviour can be drawn from research in zoos and aquariums. This paper explores those aspects of wildlife encounters that appear to

contribute most to conservation learning. These include observing animals in their 'natural' environment; opportunities for close encounters with wildlife; opportunities to observe animal behaviour; engaging visitors emotionally; connecting with visitors' prior knowledge and experiences; using persuasive communication; linking conservation goals and everyday actions; and providing incentives and activities to support visitors' behaviour change. The extent to which wildlife tourists may be receptive to conservation messages is also considered, in light of research in zoos and aquariums. The implications of these findings for conservation learning in the context of non-captive wildlife tourism are discussed and suggestions for future research in this area are made. Several methodological challenges facing the field are also discussed.

Ballantyne, R., Packer, J., & Hughes, K. (2009). Tourists' support for conservation messages and sustainable management practices in wildlife tourism experiences.

In Tourism Management, 30(5), 658–664.

A common justification for developing wildlife tourism attractions is that they help to secure long-term conservation of wildlife and wildlife habitats. Managers and guides often highlight their role in protecting wildlife and its habitat, yet little is known about the interests, needs and preferences of the tourists who participate in such activities – how aware are they of conservation issues; how concerned are they about the environmental impacts their visit may cause; do they expect and accept the conservation messages they receive? This research explores the perceptions, preferences and conservation awareness of tourists visiting the Mon Repos Conservation Park in Queensland, Australia. Comparison data from four other sites are also presented in order to provide a wider context for interpreting the data. The findings suggest that wildlife tourism management practices that enlist tourists as conservation partners, communicate the reasons behind any constraints imposed, and present a consistent message regarding

interactions with wildlife, are likely to be most successful in meeting the needs of both tourists and wildlife.

Packer, J., & Ballantyne, R. (2010). The role of zoos and aquariums in education for a sustainable future.

In New Directions for Adult and Continuing Education, 2010(127), 25-34.

Throughout history, zoos and aquariums have fulfilled a number of different roles, including the collection and display of exotic animals; scientific research; the provision of entertainment, recreation and leisure; zoological education; animal welfare advocacy; conservation fundraising; in situ and ex situ conservation programmes; and conservation education. More than 600 million people – approximately 10% of the world’s population – visit over 1300 zoos and aquariums throughout the world each year (<http://www.waza.org/en/site/zoos-aquariums>). For many urban residents, a visit to a zoo or aquarium provides a rare opportunity to connect with nature. Most zoos and aquariums today consider education to be a central role. The vision of the World Association of Zoos and Aquariums (2005, p. 35) is that: “Zoos and aquariums with their unique resource of live animals, their expertise, and their links to field conservation will be recognized as leaders and mentors in formal and informal education for conservation.” Most zoos and aquariums have education staff and trained volunteers who provide education programs for school groups and general visitors; animal demonstrations routinely convey education or conservation messages; and interpretation and education are an integral part of zoo and aquarium exhibits. Although conservation education is an accepted part of the mission of modern zoos and aquariums, it is not usually at the top of most visitors’ “to do” list for their day at the zoo. The remainder of this chapter thus considers environmental learning (changes in cognition, affect, attitudes and behaviour in relation to both the conservation of species and protection of the environment) in zoos and aquariums from the visitors’ perspective. What are they looking for from their visit and how compatible is this with the zoo’s

mission? What evidence is there that learning is taking place, and what impact does this have on environmental behaviours? How can zoos and aquariums support and encourage environmental learning and the adoption of environmentally sustainable behaviours?

Packer, J., Ballantyne, R., & Falk, J. (2010). Exploring the impacts of wildlife tourism experiences on visitors' long-term environmental learning and behaviour.

In Journal of the International Zoo Educators Association, 46, 12-15.

Zoos, aquariums and ecotourism experiences have the potential to positively impact visitors' awareness, appreciation and actions in relation to the wildlife they encounter and the environment in general. This paper presents findings from a three-year study of the impacts of wildlife tourism experiences on visitors' environmental learning. The study investigated how visitors' entering attributes and specific aspects of the experience contribute to changes in visitors' knowledge, attitudes, and engagement in environmentally responsible behaviours. Visitors' memories of their experiences were also analysed to reveal the processes which lead to long-term changes in environmentally responsible behaviours. The study investigated these impacts at four marine-based wildlife tourism venues in South-East Queensland in order to identify the nature and extent of long-term learning and environmental behavior change outcomes. The research clearly demonstrated the power of wildlife to evoke lasting memories and transformative experiences.

Ballantyne, R., and Packer, J. (2011). Using tourism free-choice learning experiences to promote environmentally sustainable behaviour: the role of post-visit 'action resources'.

In Environmental Education Research, 17(2), 201-215.

This paper argues the need for the providers of ecotourism and other free-choice environmental learning experiences to promote the adoption of environmentally sustainable actions beyond their own sites, when visitors return to their home environments. Previous research indicates that although visitors often leave such experiences with a heightened awareness of conservation issues and intentions to adopt environmentally responsible behaviours, only a minority translate these intentions into real actions. Building on research and theory in relation to visitor experiences in free-choice learning environments, the paper identifies three different stages in the educational process and proposes a strategy for facilitating the translation of visitors' behavioural intentions into the adoption of sustainable actions through the provision of post-visit action resources.

Ballantyne, R., Packer, J., & Falk, J. (2011). Visitors' learning for environmental sustainability: testing short- and long-term impacts of wildlife tourism experiences using structural equation modelling.

In Tourism Management, 32(6), 1243-1252.

Wildlife tourism experiences have the potential to positively impact tourists' awareness, appreciation and actions in relation to the specific wildlife they encounter and the environment in general. This paper investigates the extent of such impact across multiple sites, and uses Structural Equation Modelling to identify factors that best predict positive long-term learning and environmental behaviour change outcomes. Three sets of variables were measured – visitors' entering attributes (including pre-visit environmental orientation and motivation for

the visit), salient aspects of the experience, and short- and long-term learning and environmental behaviour change outcomes. Although attributes such as pre-visit commitment and motivation to learn were among the best predictors of the long-term impact of the experience, there was evidence that aspects of the experience were also important. In particular, reflective engagement which involved cognitive and affective processing of the experience was found to be associated with short- and long-term environmental learning outcomes. The implications for wildlife tourism managers are discussed.

Ballantyne, R., Packer, J., & Sutherland, L. (2011). Visitors' memories of wildlife tourism: Implications for the design of powerful interpretive experiences.

In Tourism Management, 32(4), 770-779.

One of the aims of wildlife tourism is to educate visitors about the threats facing wildlife in general, and the actions needed to protect the environment and maintain biodiversity. To identify effective strategies to achieve this aim, this paper examines participants' memories of their wildlife tourism experiences and explores processes through which such experiences can lead to long-term changes in conservation behaviour. Findings are based on 240 visitors' extended open-ended responses to a follow-up web survey administered approximately four months after a visit to one of four marine-based wildlife tourism venues in South-East Queensland. Qualitative analysis revealed four levels of visitor response to the experience, implying a process involving what visitors actually saw and heard (Sensory Impressions), what they felt (Emotional Affinity), thought (Reflective Response), and finally what they did about it (Behavioural Response). Recommendations are provided for ways tourism managers and wildlife interpreters can maintain and strengthen these dimensions of memorable experiences in order to enhance visitor satisfaction and encourage visitors' long-term adoption of environmentally sustainable practices.

Hughes, K. (2011). Designing post-visit action resources for families visiting wildlife tourism sites.

In Visitor Studies, 14(1), 66-83.

Interpretation at zoos, aquariums, and other wildlife tourism sites is generally designed to raise visitors' awareness and appreciation of natural resources and alert them to the impact of human activities on wildlife populations. However, there has been little investigation of what prompts visitors to adopt conservation actions, and whether reinforcing on-site messages with post-visit support can assist in this process. The aim of the present research was to firstly, design family learning materials to support and extend the learning that occurs as a result of viewing wildlife; and secondly, to ask families visiting a turtle rookery in Queensland, Australia to use the resources and report on their effectiveness. One hundred Australian families were sampled at the site; 3 months later 45 families returned questionnaires relating to the impact of the support materials on their long-term conservation knowledge, attitudes, and behaviour. Components that were rated as particularly effective are presented and the importance of providing post-visit updates that connect visitors directly back to their viewing experience is discussed.

Hughes, K., Packer, J., & Ballantyne, R. (2011). Using post-visit action resources to support family conservation learning following a wildlife tourism experience.

In Environmental Education Research, 17(3), 307-328.

Wildlife tourism experiences are often promoted for their ability to enhance visitors' conservation knowledge, attitudes and behaviour, yet studies exploring the long-term influence of such experiences are rare. This research explores the impact of a wildlife tourism experience and post-visit support on families' adoption of conservation practices following their visit. In stage one, barriers and benefits associated with six conservation practices were identified and incorporated into the design of

post-visit action resources. Two hundred Australian families visiting Mon Repos turtle rookery in Queensland, Australia were assigned to either a treatment group (given post-visit support) or a control group (no support). Three months after their visit, families in the treatment group were significantly more likely to report changes in their conservation knowledge; their attitudes towards protecting wildlife and the natural environment; and the frequency with which they picked up litter. Treatment families also adopted significantly more conservation practices than the control group. Implications for wildlife interpretive practice and visitor management at wildlife tourism sites are discussed.

Smith, L., Angus, W., Ballantyne, R., & Packer, J. (2011). Using websites to influence visitor behaviour.

In Journal of the International Zoo Educators Association, 47, 38-41.

Zoos and aquariums are well-positioned to educate large numbers of visitors regarding the consequences of human activities for animals and the environment, to facilitate personal reflection on environmental actions and encourage the adoption of pro-wildlife behaviors. Indeed, most modern zoos stress the importance of both conservation and education in their mission statements, although few have been able to effectively demonstrate their impact in this regard.

Packer, J., & Ballantyne, R. (2012). Comparing captive and non-captive wildlife tourism.

In Annals of Tourism Research, 39(2), 1242-1245.

Wildlife tourism is broadly defined as tourism undertaken to view or encounter wildlife (Newsome, Dowling & Moore, 2004). It occurs in a range of settings including artificial environments where animals are captive (e.g., zoos, aquariums and wildlife centres) and natural habitats where animals are non-captive (e.g., ecotourism experiences, national parks). One of the main arguments for the continuing development of both captive and

non-captive wildlife tourism attractions is that they help to secure long-term conservation of wildlife and their habitats (Higginbottom, 2004; Newsome, et al, 2004). Although different types of wildlife encounters are likely to have different strengths and weaknesses (for visitors, wildlife and the environment), the relative advantages and disadvantages of different approaches to wildlife tourism remain unexplored (Ballantyne, Packer, Hughes & Dierking, 2007).

Hughes, K. (2013). Measuring the impact of viewing wildlife: do positive intentions equate to long-term changes in conservation behaviour?.

In Journal of Sustainable Tourism, 21(1), 42-59.

Studies exploring the impact of environmental interpretation on visitors' conservation knowledge, attitudes and behaviour often measure impacts as visitors exit tourism sites. For ease of measurement, their intentions are often used as indicators of behavior change. Recent longitudinal studies suggest that intentions may be poor indicators of long-term behaviour change. This study examines both the behavioural intentions and the long-term conservation behaviour of 100 Australian families participating in a wildlife viewing experience. Respondents who reported being negatively or positively emotionally involved in the experience were more likely to indicate an intention to change their behaviour. New ideas about animals and their habitats were also significantly correlated with the development of positive behavioural intentions. Three months later, for 10 of the 13 conservation behaviours explored, the majority of respondents who intended to increase their participation did not. Implications for using intentions as an indicator of programme effectiveness are discussed. The importance of providing post-visit support that incorporates specific strategies, localised examples, petitions and activities to help visitors convert their intentions into behaviour prior to their enthusiasm waning is highlighted. Suggestions are made for more longitudinal studies in this area.

Packer, J., & Ballantyne, R. (2013). Encouraging reflective visitor experiences in ecotourism.

In Ballantyne, R., & Packer, J. (Editors). International Handbook on Ecotourism. (Pp.169-177) Edward Elgar Publishing.

Reflection has long been recognised as an important, perhaps even necessary component of experiential learning, or learning from doing. It is an integral part of Kolb's (1984) experiential learning cycle, Revans' (1980; 1982; 1998) process of action learning, and Schon's (1983; 1987) reflective practitioner. Recent research has revealed that it is also an important component of learning in tourism and leisure contexts (Ballantyne, Packer and Falk, 2011; Ballantyne, Packer and Sutherland, 2011). The concept of mindfulness (Langer, 1989; 1997; Moscardo, 2009) has also often been used in these contexts, highlighting the need for visitors to consciously maintain awareness and control over their thoughts and behaviour. This chapter argues that visitor mindfulness is a necessary but not sufficient pre-condition for the kind of learning that changes lives – the kind of learning that ecotourism aims to encourage. It suggests that in order to facilitate meaningful and lasting changes in visitors' environmental behaviours, ecotourism operators need to encourage visitors to intentionally reflect on their experience and its meaning for their lives, and to make concrete and achievable plans for changes they will make in response to their experience. Ideally, they should also find ways to follow up with their visitors, to hold them accountable to their own commitments. This chapter suggests ways in which this might be achieved.

Packer, J., & Ballantyne, R. (2013). Developing ecotourists' environmentally sustainable behaviour.

In Ballantyne, R., & Packer, J. (Editors). International Handbook on Ecotourism. (pp. 192-202) Edward Elgar Publishing.

Most definitions of ecotourism include some kind of environmental education or interpretation component. In Australia, ecotourism accreditation requires that the experience fosters environmental and cultural understanding, appreciation and conservation (Ecotourism Australia, 2012). Some form of environmental education has thus become a key component of most ecotourism experiences. Not only does the ecotourism industry have the responsibility to minimize its own negative impacts, it also has the opportunity to play a positive role in helping to solve global environmental problems by providing environmental learning experiences that promote positive change in people's everyday behaviour and lifestyles. In this paper, it is argued that ecotourism operators not only have a moral and ethical responsibility to take advantage of this opportunity, but by doing so, will add value to the experience they provide for their visitors. Albeit being small, ecotourism providers are well placed to draw people's attention to the issues and provide them with a reason to care to support their lifelong environmental learning and encourage more sustainable behaviour. This chapter introduces how this may be achieved.

Mann, J., Ballantyne, R., & Packer, J. (2014). International research on zoo and aquarium visitors-Some new perspectives.

In World Association of Zoos and Aquariums Magazine, 15, 18-21.

As advances in technology improve our ability to communicate, tap previously inaccessible resources, fight ever more complex wars and cure previously incurable diseases; they also drive us further away from nature, the very foundation upon which our society exists. Virtual reality has taken over from real life and

most people in western nations are more in touch with a screen than a tree. Rekindling a connection with nature and animals is critical for the future of mankind. Zoos and aquariums can, through research, education and visitor experiences, help to reverse the current tide of destruction threatening to overwhelm the planet. This can be achieved by stimulating people to care, equipping them with the knowledge to take action and providing them with the tools they need to act. However, there is still much to learn about how to do this more effectively and research into this field is not yet fully developed. This paper will present some results of recent international research which investigated the congruency between visitors' views on the role of aquarium and zoos and the conservation mission of such facilities, and will share some suggestions of how to enhance environmental learning and encourage post-visit environmental behaviour.

Packer, J., Ballantyne, R., & Hughes, K. (2014). Chinese and Australian tourists' attitudes to nature, animals and environmental issues: Implications for the design of nature-based tourism experiences.

In Tourism Management, 44, 101-107.

This study investigated the differences and similarities between Chinese and Australian visitors' attitudes toward nature, animals and environmental issues, in order to inform the design of visitor experiences and interpretive programs that address the needs and interests of Chinese visitors to Australia. Questionnaires were completed by a total of 267 Chinese and 258 Australian visitors to a nature-based island resort in Queensland, Australia. Results indicate that Chinese visitors had a greater sense of connection with, but more anthropocentric view of nature than Australian visitors; had less experience with, and a greater fear or dislike of animals; and were more aware of, interested in, and concerned about environmental issues. Recommendations are made for the design of interpretive experiences that are relevant and effective for Chinese visitors.

Ballantyne, R., & Packer, J. (2016). Visitors' perceptions of the conservation education roles of zoos and aquariums: implications for the provision of learning experiences.

In Visitor Studies, 19(2) 193-210.

Many zoos and aquariums consider themselves to be conservation organizations with a mission to educate and promote visitors' adoption of environmentally sustainable behaviour. This paper investigates the extent to which visitors share this view and discusses the implications of the findings for the provision of on-site and post-visit conservation education. A survey of 1546 visitors to 13 zoos and aquariums found that although visitors gave highest priority to entertainment aspects of the experience, they also considered the provision of conservation education to be an important aspect of a zoo or aquarium visit. The findings suggest that zoos and aquariums need to develop new ways of engaging visitors for whom conservation learning is not the major purpose for visiting and provide post-visit experiences that reinforce and extend on-site conservation messages and action. Suggestions for accomplishing these are discussed.

Mann-Lang, J. B., Ballantyne, R., & Packer, J. (2016). Does more education mean less fun? A comparison of two animal presentations.

In International Zoo Yearbook, 50(1), 155-164.

Animal presentations have the potential to reach zoo and aquarium visitors with powerful conservation messages that inspire environmentally responsible behaviour. However, there is limited information available on the style of presentation that would be most effective in achieving the greatest impact. This research study was designed to investigate the impact of two differently designed dolphin presentations on conservation-learning outcomes and overall enjoyment of visitors. The results showed that increasing the educational content of the presentation enhanced visitor learning considerably, without

detracting from their enjoyment of the presentation. The research provides evidence for the value of animal presentations in the conservation-education programmes of zoos and aquariums, and provides suggestions of how to increase the impact of such presentations.

Sneddon, J., Lee, J., Ballantyne, R., & Packer, J. (2016)
Animal welfare values and tourist behaviour.

In Annals of Tourism Research, 57, 234–236.

The welfare of animals is an important societal concern that impacts tourist behaviour. Studies show an increase in public concern for the treatment of animals (Eurobarometer, 2007; Riffkin, 2015), evident in a wide range of behaviour from everyday food choices to clothing, entertainment and travel decisions (Fennell 2012; Mathews & Herzog, 1997; Phillips, 2008; Phillips et al 2012; Verbeke, 2009). This suggests that the systematic concern for the well-being of animals is a central, desirable goal that transcends situations for a growing segment of society. Despite this, research continues to view animal-welfare concerns as situation specific attitudes rather than trans-situational guides. In this paper, we argue that conceptualising animal-welfare as a personal value and situating it within a system of values can lead to new insights into tourist behaviour.

Driml, S., Ballantyne, R., & Packer, J. (2017). How Long Does an Economic Impact Last? Tracking the Impact of a New Giant Panda Attraction at an Australian Zoo.

In Journal of Travel Research, 56(5), 613-624.

A concerning issue with Economic Impact Analysis (EIA) is that many EIAs give results for one year, without being explicit about how long impacts are expected to last. New tourism attractions should not be assumed to provide continuing positive impacts into the future. For instance, the Giant Pandas at Adelaide Zoo generated a positive economic impact in their first year of residence (22% of a sample of tourists visited Adelaide “due to

pandas,” additional tourism expenditure in the region was \$27.7 million, with \$2.3 to \$4.6 million captured by the zoo); however, increased numbers visiting to see the pandas lasted only two years. Investment decision makers expected larger, longer-term economic benefits than eventuated, and the zoo experienced financial difficulties. This study provides advice for predictive EIA of new tourism attractions and prompts a call for tourism EIA studies to be explicit about the time period for which results are relevant.

Hofman, K., & Hughes, K. (2017). Protecting the Great Barrier Reef: analysing the impact of a conservation documentary and post-viewing strategies on long-term conservation behaviour.

In Environmental Education Research, 1-16.

Nature-based tourism experiences have the potential to change the environmental knowledge, attitudes and behaviour of visitors; but such experiences may be beyond the physical and/or financial reach of many people. To influence the conservation behaviour of populations worldwide, a more accessible yet equally effective strategy is required. Using an experimental design, this study explored whether a conservation documentary about Australian marine environments, together with post-viewing support materials, prompted the adoption of conservation behaviours. Questionnaires revealed environmental knowledge, attitudes and behavioural intentions rose immediately after viewing the documentary. Ten weeks later, these levels were maintained or decreased slightly for those who received post-viewing support (Facebook, help sheet or both), but decreased markedly in the control group. Results are similar to those reported in wildlife tourism studies. Implications for the use of documentaries in place of nature experiences are discussed.

Ballantyne, R., Lee, J., Packer, J., Hughes, K., & Sneddon, J. (in press). Visitors' values and environmental learning outcomes at wildlife attractions: implications for interpretive practice.

In Tourism Management.

Wildlife tourism attractions, such as zoos and aquariums, are expected to play a major role in promoting environmental learning in society. This paper applies a refined version of Schwartz's (1992) Value Theory to develop a better understanding of zoo and aquarium visitors' personal values, and the impact of their values on their reflective engagement, learning, and self-reported changes in post-visit environmental behaviour. Findings revealed that personal values are related to post-visit environmental behaviour through the process of on-site reflective engagement. The findings highlight the importance of using a values-based approach to visitor interpretation, one that engages a broader range of visitors and enhances the impact of a wildlife tourism experience on visitors' environmental learning and post-visit behaviour.

Ballantyne, R., Packer, J., Hughes, K., & Gill, C. (under review) Post-visit reinforcement of zoo conservation messages: the design and testing of an action resource website.

Wildlife tourism attractions such as zoos are uniquely placed to make an impact on people's everyday environmentally responsible behaviours as they engage directly in conservation activities and are visited by large numbers of visitors each year. However, research suggests that visitors who leave such sites with a heightened awareness and good intentions rarely translate their intentions into post-visit environmental actions. This paper reports on the development of a persuasive website-based action resource designed to reinforce, complement and extend zoos' on-site conservation messages and support visitors' translation of environmental behavioural intentions into

actions. The effectiveness of the website in encouraging post-visit engagement in environmental behaviour was tested using an experimental design with a follow-up sample of 475 zoo visitors across four sites in three countries. Website features identified as most effective in engaging visitors and maximizing their uptake of environmentally sustainable behaviour are discussed.

Mann-Lang, J., Ballantyne, R., & Packer, J. (under review). Penguin Promises: Encouraging aquarium visitors to take conservation action.

This study investigates the impact of an innovative conservation action campaign Penguin Promises implemented at uShaka Sea World in Durban, South Africa. Communication tools included interpretive signage, exhibits with and without animals, presentations, and personal interactions, along with a specially designed postcard, on which visitors could write a promise (pledge) to make a change in their daily lives to become more environmentally responsible. Visitors who completed a card were contacted a year or more after their visit and asked about the outcomes of their promise. The results (N=316) showed that 49.4% of respondents could give an example of something positive they had done for the environment, that they attributed to the campaign. Recommendations are provided for the design of effective visitor conservation action campaigns.

ENVIRONMENTAL INTERPRETATION

Ballantyne, R., Packer, J., & Hughes, K. (2008)
Environmental awareness, interests and motives of
Botanic Gardens visitors: Implications for interpretive
practice.

In Tourism Management, 29(3), 439-444.

Botanic gardens attract a wide range of domestic and international tourists, as well as regular visitors from their local areas. As both conservation and education are among the objectives of botanic gardens, they are potentially well-placed to offer community education about conservation, to engender pro-conservation attitudes, and to encourage the public to support conservation efforts. In order to inform the development of appropriate interpretive strategies targeting conservation issues, information is needed regarding visitors' existing conservation awareness, interests and motives for visiting. This paper addresses this need by describing the environmental awareness, interests and motivations of 150 visitors to the Mt Coot-tha Botanic Gardens. Gardens visitors were found to be less interested in and committed to conservation issues, and less motivated to learn, than visitors to other free-choice learning settings such as museums, zoos, aquariums, heritage sites, natural areas and wildlife tourism activities. The implications for interpretive practice in botanic gardens are discussed.

Xu, H., Cui, Q., Ballantyne, R., & Packer, J. (2013). Effective
environmental interpretation at Chinese natural
attractions: The need for an aesthetic approach.

In Journal of Sustainable Tourism, 21(1), 117-133.

In western society since the 1970s, interpretation has played an important role in improving tourists' appreciation of the natural environment, developing their environmental attitudes and facilitating the adoption of environmentally sensitive behaviour.

In China, interpretation of natural attractions is a more recent phenomenon and a largely cognitive approach has been taken, focusing on the presentation of scientific information. This paper questions whether the “scientific” approach used in the development of environmental interpretation in Chinese natural areas meets the needs of Chinese tourists. It explores this theoretically through an examination of the relationship between Chinese tourists and the natural landscape, noting that landscape memories and intangible cultural heritage are important mediators of Chinese landscape appreciation. Practically, research in the Danxia Shan National Natural Reserve and Geo-Park demonstrates that self-guided interpretation using the “western” scientific approach with signage, an information centre and a geological museum, is ineffective, and ignored by the majority of visitors. Guided tours, employing an “aesthetic” approach to interpretation, using stories, art and poetry to emotionally engage visitors with the landscape, appear more appropriate, culturally relevant and effective in China. Key techniques used by guides include numerous adjectival words, figurative or metaphorical landscape descriptions and exaggeration of the landscape's beauty.

Hughes, K., Ballantyne, R., & Packer, J. (2014). Chinese and Western visitors' responses to interpretive signs at Chengdu Research Base of Giant Panda Breeding, China.

In Visitor Studies, 17(2), 137–158.

Visitor experiences and interpretation at wildlife tourism sites are often designed to encourage visitors to adopt conservation actions. Typically, conservation messages are delivered via one-size-fits-all interpretive signage, with little consideration given to whether the same information attracts and engages different cultural groups. This study explores Chinese and international visitors' perceptions of signage at the Chengdu Research Base of Giant Panda Breeding in China. Four sign prototypes were designed and a combination of visitor observations, interviews, and exit surveys were used to test their

attracting and holding power. Comparisons of Chinese and Western visitors revealed no significant difference in the proportion who stopped to read signs. Preferences for signage elements were also similar across the two cultural groups; however, there were differences in terms of what visitors thought should be included in wildlife interpretation. Implications for the design and delivery of interpretation in Chinese wildlife tourism settings are discussed.

**Packer, J., Ballantyne, R., & Luebke, J. (Submitted)
Visitors' perceptions of zoo animals' health, happiness
and well-being: implications for zoo exhibit interpretation.**

Submitted 27 February 2017, Visitor Studies

Modern zoos face increasing pressures to maintain and demonstrate both the physical and psychological well-being of animals in their care. However, the informal judgements that zoo visitors make about animal well-being may be based on criteria that are inaccurate or misleading. In this research, self-administered questionnaires with quantitative and qualitative components were used to explore the indicators that zoo visitors use, consciously or unconsciously, to judge the well-being of gorillas in a naturalistic zoo exhibit. The results demonstrate that visitors are willing to make judgements of animal welfare, able to articulate the reasons underlying their judgements, use different indicators when judging health and happiness, and are unconsciously influenced by environmental aspects of the exhibit. Visitors' assessments of animal well-being were positively related to their emotional connections with the gorillas and their satisfaction with the visit. Suggestions are provided regarding interpretive information that zoos might provide to better inform visitors' perceptions of animal well-being.

ENVIRONMENTAL LEARNING AND STUDENT EDUCATION PROGRAMS

Ballantyne, R., & Packer, J. (2009). Introducing a fifth pedagogy: experience-based strategies for facilitating learning in natural environments.

In Environmental Education Research, 15(2), 243–262.

Educators have identified four categories of ‘productive pedagogies’ that are considered to lead to authentic student engagement and learning in the classroom. This study was designed to explore and extend these pedagogies in the context of learning in natural environments, in particular, through the programs of Queensland Environmental Education Centres. In-depth interview and observation data were collected from students, classroom teachers and Centre teachers who had participated in twelve environmental education programs across Queensland, in order to identify the strategies that are most effective in facilitating learning in the natural environment. A fifth productive pedagogy category, “Experience-Based Learning”, is proposed. Experience-based learning is particularly important in addressing students’ environmental attitudes and actions. The implications for the delivery of environmental education programs both within and outside the classroom are discussed.

Ballantyne, R., Anderson, D., & Packer, J. (2010). Exploring the impact of integrated fieldwork, reflective and metacognitive experiences on student environmental learning outcomes.

In Australian Journal of Environmental Education, 26, 47-64.

Although the important role of providing fieldwork experiences for students in the natural environment is now well-established within environmental education literature, there is still little research evidence to guide teachers in their choice of effective teaching strategies. This paper presents findings from an

interpretive case study designed to investigate the value of combining experience-based fieldwork in a mangrove and coastal environment with reflective and metacognitive activities. Analysis of video recordings, researcher observation notes and interviews of a class of Year 11 biology students who participated in the activities resulted in the emergence of five themes. These themes together provided evidence of enhanced student environmental learning, and included student appreciation for various learning contexts, self-awareness of group learning processes, and awareness of the integration of cross-curriculum knowledge. The study supports and illustrates the contention that the most effective environmental learning experiences are likely to be those that integrate learning in the natural environment with classroom learning strategies.

MAJOR PROJECTS 2005-2017

- 2016-2018 Australian Research Council (ARC) Linkage Grant, Improving zoo/aquarium conservation learning outcomes: a values approach.
- 2016-2020 South African National Parks Visitor Research Programme.
- 2014-2015 Capital Attractions Canberra, Investigation of the impact of school student visits to Canberra attractions.
- 2013-2015 Australian Research Council (ARC) Discovery Grant, On being Australian: exploring the role of ANZAC museum and heritage experiences in developing visitors' national identity.
- 2012-2014 Australian Research Council (ARC) Linkage Grant, Translating zoo visitors' behavioural intentions into conservation actions using evidence-based post-visit experiences.
- 2012 South African Visitor Research Programme, South African National Research Foundation.
- 2011-2012 Aquarium Visitor Environmental Behaviour, uShaka and Two Oceans Aquariums.
- 2010-2011 Investigating the impact of giant pandas on visitors to the Adelaide Zoo.
- 2009-2010 Designing the Reintroduction Field Research Centre for giant pandas (Dujiangyan). Chengdu Research Base for Giant Panda Breeding.
- 2007 Mon Repos Conservation Park Visitor Research.
- 2007-2005 Australian Research Council (ARC) Discovery, Investigating the educational impact of wild-life based leisure experiences in supporting visitors' adoption of environmentally sustainable practices.
- 2007-2004 Australian Research Council (ARC) Linkage, Learning for sustainability: the role and impact of outdoor and environmental education centres.



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