



Feeding wildlife as a tourism attraction: a review of issues and impacts

Mark B. Orams*

Coastal-Marine Research Group, Massey University at Albany, Private Bag 102 904, North Shore MSC, New Zealand

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Abstract

The feeding of wildlife has become a popular means by which tourists and tourism operators can facilitate close observation and interaction with wildlife in the wild. These practices are widespread and have a variety of impacts on the wildlife—and on the tourists. Deliberate and long-term provision of food to wildlife has been shown to alter natural behaviour patterns and population levels. It has also resulted in the dependency of animals on the human provided food and their habituation to human contact. Intra- and inter-species aggression has also occurred where wildlife, in their efforts to obtain food, have harmed one another and harmed tourists. There are also important health implications arising from artificial food sources where injury and disease have resulted. While the great majority of cases show negative impacts arising from supplemental feeding of wildlife, this is not always the case. Certainly there are psychological, social and economic benefits that are experienced on the human side of the interaction and, in a limited number of cases, the wildlife can be shown to have benefited as well. The issue of feeding wildlife for tourism is a controversial one with little consensus regarding how it should be managed. Approaches range from complete prohibition, to active promotion and management, to simply ignoring the practices. Little empirical research, inconsistent management and differing views of the role of animals in humans' lives ensure that this issue will remain a contentious one worthy of further examination and consideration. © 2002 Elsevier Science Ltd. All rights reserved.

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1. Preface

The relevance of the topic reviewed in this paper is illustrated by the recent tragic results of interaction between tourists and dingoes on Fraser Island, Queensland, Australia. While not wishing to sensationalise the issue, this case does illustrate the sometimes dramatic results of underestimating the potential consequences of feeding wildlife. More importantly, it shows that both tourists and management agencies have an obligation to carefully consider the impacts of tourism on wildlife and vice-versa. Furthermore, it provides evidence that greater attention needs to be paid to developing effective management strategies that are based upon knowledge and the precautionary principle.

Australia's killer dingoes shot dead

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*Tel.: +64-9-443-9799; fax: +64-9-441-8109.

E-mail address: m.b.orams@massey.ac.nz (M.B. Orams).

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Two dingoes that mauled a nine-year-old boy to death and bit his seven-year-old brother at a popular holiday spot have been destroyed. Rangers shot the dingoes several hours after the boys were attacked on the World Heritage-listed Fraser Island, a popular destination for backpackers and families off the northern state of Queensland (Australia). Locals blamed tourists for feeding scraps of food to the dingoes, many of which roam freely on the island and have been known to attack.

2. Introduction

Throughout history people have had close relationships with animals. For example, in a wide variety of cultures, over many centuries, particular species (such as those from the feline and canine families) have been

specifically bred and “tamed” as domestic pets. Irrespective of their use as “companions”, interaction with animals has been a central part of human life because animals have provided much of the food supply for most societies. Today, many indigenous peoples continue to interact with wildlife for spiritual and cultural reasons as well as for food. However, although hunting animals for food and for sport has existed for thousands of years, the idea of visiting and observing wild animals for recreational purposes, as a tourist attraction, has been a more recent phenomenon. As a result of the exploration of the “new world” by Europeans in the 18th and 19th centuries, specimens (usually dead) of new, strange and exciting creatures began to arrive back in Europe (for example, see Anderson, 1878). A curiosity developed in the upper class societies of Western Europe and “safaris” to view and hunt wildlife, particularly in Africa, began to grow in popularity (Adler, 1989). Soon after, “zoological gardens” (zoos) began to appear as these early wildlife tourists began to bring back specimens from their travels. Since that time, the growth of facilities that hold wildlife captive and the creation of specific locations that protect wildlife (such as national parks) has become widespread (Yale, 1991). Many large cities throughout the world now have zoos, in fact, by the early 1980s there were almost 800 zoos worldwide (Yale, 1991). In addition, many countries manage networks of natural areas where wildlife is protected by law, but that allow and promote their observation by tourists (Shackley, 1996). The range of opportunities for tourists to interact with wildlife continues to increase. A correspondent growth in the amount of literature that considers how these interactions should be managed has occurred (examples include Vickermann, 1988; Shackley, 1992; Kerr, 1991; Albert & Bowyer, 1991; Duffus & Dearden, 1993; Orams, 1995).

Some of this literature quantifies the growth and economic importance of this wildlife-based tourism. For example, Vickermann (1988) estimated that in the late 1980s US\$14 billion was spent annually on wildlife viewing, photography and the feeding of wildlife. Rockel and Kealy (1991) report on an earlier study in 1980 that around 29 million people took trips specifically to interact with wildlife in the United States. Even in small remote communities wildlife-based tourism has been found to have a significant impact. For example, Orams (2000) found that whale watching in the small South Pacific island community of Vava’u (population 16,000) in Tonga was worth in excess of US\$600,000 per year. Wildlife interaction (observing, feeding, touching, photographing or otherwise experiencing wild animals), therefore, occurs in a wide variety of settings throughout the world. It is also clear, from a variety of published reports, that it is becoming increasingly popular (Duffus & Dearden, 1990; Clamen & Rossier, 1991; Duffus &

Wipond, 1992; Heath, 1992; Muir, 1993; Hammitt, Dulin, & Wells, 1993; Shackley, 1996; Ryan, 1998).

This increasing popularity occurs within the broader context of an increasing demand for opportunities to interact with nature (Jenner & Smith, 1992). A number of writers consider this growth in nature-based tourism, and more specifically wildlife-based tourism, to be a potential saviour for wildlife (Davies, 1990; Groom, Poldosky, & Munn, 1991; Borge, Nelson, Leitch, & Leistriz, 1991; Barnes, Burgess, & Pearce, 1992; Burnie, 1994). However, others are cautious. For example, Gauthier (1993, p. 98) states:

While there are many advantages for humans in the recreational enjoyment of wildlife, I am hard-pressed to conceive of any advantages for the wildlife...

Others are outright cynical about the so-called environmentally sensitive or sustainable ecotourism (for example, see Butler, 1990; Wheeler, 1991; Zell, 1992; Pleumarom, 1993; Wheeler, 1994). There are many cases that illustrate the negative impacts that often result from tourist–wildlife interaction (examples include Hanna & Wells, 1992; Burger & Gochfield, 1993; Griffith & Van Schaik, 1993; Ingold et al., 1993; Wallace, 1993; Viskovic, 1993; Muir, 1993; Orams, 1995). This is particularly the case when deliberate or accidental feeding of the wildlife takes place (Shackley, 1996). In fact, many biologists, wildlife managers, conservationists and natural resource managers are vehemently opposed to the feeding of any wildlife (Burger, 1997). Yet there are a great number of locations where the feeding of wildlife is actively encouraged (for example, Dengate, 1997). Despite this controversy, there are few, if any, comprehensive reports that consider the impacts of the feeding of wildlife as a tourism attraction—and yet the practice is widespread and growing. This paper considers the impacts of feeding wildlife—in the wild—and briefly outlines the approaches currently adopted in managing these impacts. In doing so it attempts to give the reader a greater understanding of the potential influences of the wide spread practice of feeding wild animals. Further, it seeks to encourage both tourists and those responsible for wildlife management to carefully consider such activities in light of the findings of this comprehensive review of the literature pertaining to the artificial feeding of wild animals.

2.1. Context

Orams (1996) provides a model that categorises tourist–wildlife interaction on a captive, semi-captive and wild scale (Fig. 1). This model, called the “Spectrum of Tourist–Wildlife Interaction Opportunities” (SoT-WIO), explicitly identifies the feeding of wildlife as an activity that commonly falls between the semi-captive

(after Orams, 1996)

| <i>Category</i> | <i>Setting</i> | <i>Example</i> | <i>Degree of Human Influence</i> |
|-----------------|------------------------|--|----------------------------------|
| CAPTIVE | Aviaries | Gondwanaland (Qld, Australia) | Completely human constructed |
| | Zoos | San Diego Zoo (California) | |
| | Oceanariums | SeaWorld (Florida) | |
| | Aquariums | Monterey Bay Aquarium (California) | |
| SEMI-CAPTIVE | Wildlife Parks | Dolphins Plus (Florida) | Elements human-made |
| | Rehabilitation Centres | | |
| | Sea pens | | |
| | ← Feeding wildlife | Monkey Mia Dolphins (Western Australia) Reef Sharks (Bahamas) "Kea" Mountain Parrots (New Zealand) | |
| WILD | National Parks | Kruger National Park (South Africa) | Natural environment |
| | Migratory Routes | Cape Cod (Whale-watching - Massachusetts) | |
| | Breeding Sites | Mon Repos (Sea-turtles - Queensland, Australia) | |
| | Feeding/Drinking Sites | | |

Fig. 1. The spectrum of tourist–wildlife interaction opportunities.

and wild categories (although it also occurs in semi-captive and captive environments as well). Orams (1996) argues that a challenge involved in viewing wildlife in the wild (as opposed to in captive or semi-captive settings) is that the reliability of sighting the animal/s is reduced. The use of food to attract the wildlife so that they can be viewed is therefore attractive for tourists and tourism operators alike because it increases the likelihood of actually sighting the animals. This is particularly important for commercial tourism operators who base their business on the wildlife because without reliable sighting of the animals their financial viability is compromised.

3. Impacts

There is a wide variety of impacts that can occur as a result of feeding wildlife. However, it should not be assumed that these impacts are always negative. While the great majority of literature details negative consequences for the wildlife and, in some cases for the tourists, it is important to acknowledge that there are economic, social, psychological and environmental benefits that can result. Nevertheless, the weight of evidence provided in the literature shows that the feeding of wildlife produces significant problems. The following review attempts to summarise these problems but also to consider potential benefits.

3.1. Alteration of natural behaviour patterns and population

Food availability is the single most important factor in determining an animal's activity budget—the time allocated to particular activities (Goodson, Stevens, & Bailey, 1991; Shepherdson, Carlstead, Mellen, & Seidensticker, 1993; Westerterp, Donkers, Fredrix, & Boekhoudt, 1995; Stock & Hofeditz, 1996; Adeyemo, 1997; Baldellou & Adan, 1997). With supplemental feeding from tourists, animals typically need to spend less time foraging and hunting, and are thus free to spend more time of their daily lives on other activities, such as socialising, resting or traveling (Doenier, Delgiudice, & Riggs, 1997). It may also influence the extent of an individual's home range (Eifler, 1996). Boutin (1990), for example, conducted a review of deliberate supplemental feeding of (mainly) small terrestrial vertebrates and found that in most cases (where home range size was examined) a reduced home range resulted. A number of cases have also shown that supplemental feeding can contribute to an increase in breeding activity (Boutin, 1990), group size (Lyndaker, 1987) and in population density (Gilbert & Krebs, 1981; Asquith, 1989; Sullivan, 1990). Other research has suggested that provisioning alters the normal migration patterns of animals causing animals to stay year round in areas that they would normally abandon (Paton, Dorward, & Fell, 1983). Furthermore, supplemental feeding also can permanently alter the composition of

animal communities where larger, more aggressive species (more likely to successfully access human provided food) become more abundant than would usually be the case under natural conditions.

It should not be assumed, however, that alteration to an animal's daily activity budget, breeding activities or migration patterns is always negative. An animal's behaviour continually changes in response to the environment in which it lives. This is a fundamental of adaptation. In many cases, wildlife is already significantly influenced by human activity and feeding by tourists may simply supplement or replace other human food sources. For example, it is estimated that the most significant food source for dolphins resident in Moreton Bay, Queensland, Australia is shrimp trawler by-catch (Corkeron, 1990). The small group of dolphins which are hand feed by tourists at Tangalooma Resort on the shores of the bay may simply be substituting one human food source for another (Orams, 1995). A further example is provided by Brittingham and Temple (1988, 1992) who conducted an experiment in North America to assess whether the survival rates of black-capped chickadees was affected by the provision of bird feeders. They found no significant difference between provisioned and non-provisioned chickadee's ability to survive through the winter (when there is less "natural" food available).

Deliberate supplemental feeding of wildlife has been used in animal conservation programs, mainly in attempts to boost population size in declining or endangered populations. For example, food provisioning helped in the recovery of the endangered Mauritius Kestrel (Jones et al., 1995) and increased nestling survival in Northern Goshawks (Ward & Kennedy, 1996). These kinds of programmes to assist endangered populations have a long history dating back, for example, to the creation of "vulture restaurants" in South Africa in 1966—an idea now used to assist Eurasian griffons in Spain, California condors as well as the Cape griffons of South Africa (MacRae, 1997). However, supplemental feeding of wildlife has also been shown to result in detrimental changes, compromising the delicate ecological balance for specific species and certain areas. For example, food provisioning had a negative impact on the endangered Blackbuck in Madras by increasing the numbers of its competitors (Raman, Menon, & Sukumar, 1996). It is also possible that supplemental feeding of predators could decrease the predation pressure on natural prey, and thus influence the ecological balance in a community, by creating artificially inflated populations of certain prey species. Conversely, it has been shown that supplemental feeding can attract additional predators to the area where the provisioned animals are fed (Boutin et al., 1986). This phenomenon may explain the high incidence of shark attack on bottlenose dolphins in Moreton Bay

Queensland where both animals are attracted to the food provided by shrimp trawler by-catch (Corkeron, 1990, Orams & Deakin, 1997).

Feeding of wildlife has also been shown to manipulate reproduction. For example, many birds given supplementary food laid their eggs early (Svensson & Nilsson, 1995), and even elk showed out-of-season births (Smith, 1994) after they were provided food by people. Boutin's (1990) review showed that the breeding season was advanced or extended in 33 of 39 cases examined. Further evidence shows that juvenile female's age at first reproduction was often reduced with supplemental feeding (Ford & Pitelka, 1984; Dobson & Kjelgaard, 1985).

Thus, the provision of food to wildlife by humans almost always results in a change in the natural behaviour patterns of the wildlife. However, the effects of these changes are often difficult to assess. The assumption that any change is negative is simplistic and ignores the evidence that feeding has helped a number of endangered species to recover.

3.2. *Dependency and habituation*

Since the search for and securing of food dominates so much of an animals' time and energy budget, a change to human-provided food often results in a major change in the amount of time and effort directed by the provisioned animal to obtaining food. The ability of animals to find food is often determined by learned behaviour—such as where to go, how to approach potential prey and how to effect capture of that prey. When an animal does less of this, they quite simply become less efficient at it. As a result, the human provided food source, which usually requires less effort on the part of the animal to obtain, becomes a more attractive option. Eventually, if an animal is fed so frequently that it no longer needs to forage for itself, it may lose the ability or skills to do so and become dependent on the human handouts. This is problematic because, first, the animal is no longer self-sufficient and if separated from the human food source—or if that provisioned food is removed—the animal may starve. Second, for many animals—particularly large mammals—offspring learn the skills for obtaining food from parents (especially mothers) and other adults (Feldhammer, Krickamer, Vessey, & Merritt, 1999). If these adults are human dependent these offspring may never acquire the skills needed to fend for themselves. However, this dependency and loss of self-sufficiency does not always occur when animals are provisioned. For example, the common practice of fish feeding by tourists visiting the Great Barrier Reef does not appear to effect the ability of these fish to forage for themselves (Sweatman, 1996). Similarly, the feeding of dolphins by tourists at Tangalooma, Australia (albeit in a strictly controlled setting) does not appear to have altered their

natural foraging activities when compared with non-provisioned dolphins in the area (Brieze, Blackshaw, & Hall, 1995).

An additional problem related to the dependency on human handouts is the “habituation” to human contact. The great majority of animals in the wild are wary of humans—while they may allow people to approach them (and sometimes animals may even approach the people)—they usually stay at a safe distance. This is a natural behavioural adaptation for all wildlife—by maintaining a distance they are able to escape from danger—most animals do this instinctively. An animal has few cues about whether a human approaching it has good or bad intentions and, unfortunately, not all humans are wildlife lovers. There have been numerous cases in the past of wild animals being jumped on, shot at, rammed, grabbed and injured by people (Shackley, 1996). A further issue to consider is that animals that become accustomed to receiving food from people tend to frequent areas where there is a lot of human activity. These areas tend to present greater risks to animals that are not adapted to avoid such things as cars, boats and aeroplanes. Animals that become accustomed to close human contact and that associate human activity with food are at greater risk than those that do not. For example, Crome and Moore (1990) points out that Australian Cassowaries attracted to roads as a result of roadside feeding have become susceptible to being hit by cars. Fishers have long utilised food as a means to increase their chances of a good catch. Large fish that are accustomed to hand-outs from divers have become easy prey for spear fishers. Poachers also frequently use food to attract rare and commercially valuable animals that they wish to sell (Burger, 1997). It is in a wild animal’s best interest, therefore, for them to remain wary of people. Of course, when they are being regularly provisioned with food they lose this wariness, they become habituated to human contact and, as a result, they are at greater risk of injury from someone who wishes to do them harm.

3.3. Aggression

There are numerous cases where wildlife fed by humans have become unnaturally aggressive towards people. Many researchers have reported on attacks on humans by free-ranging primates that have been fed for prolonged periods. Kamal, Boug and Brain (1997), for example, report on attacks from Hamadryas baboons on visitors in Saudi Arabia. Similarly, a study by Aggimarangsee (1993) found that human provisioned macaques in Thailand were less healthy, less active, and more aggressive towards humans than non-provisioned ones. Macaque monkeys in Gibraltar (Fa, 1992) and chimpanzees and baboons in Tanzania (Goodall, 1986; Wrangham, 1974) were also more aggressive toward

people as a result of provisioning. Other large mammals, such as bears, kangaroos, dogs, racoons and possums have also become aggressive subsequent to regular feeding. Bears at Denhali National Park (Albert & Bowyer, 1991), Yellowstone National Park (Gunther, 1992) and other locations in North America have attacked people and have become a major safety concern for park visitors. In Queensland, Australia, dingoes (wild dogs) have become aggressive toward people at Fraser Island National Park. Many consider the feeding of these dingoes as the cause of this aggression (Marsterson, 1994). Brown (1988) reports on an attack from a Kangaroo at Grampians National Park in Australia while Skira and Smith (1991) claim similar problems occur because of the feeding of wallabies, Tasmanian Devils and brushtail possums in Tasmania, Australia. In some cases people are attacked because the animal detects food but is denied it, or is teased with it. In other cases, people inadvertently frighten animals by moving too quickly or by making loud noises. Some animals interpret staring as a provocation or challenge and others respond aggressively to people retreating rapidly.

It is possible that marine mammals may be similarly affected. The United States National Marine Fisheries Service (NMFS) has long been concerned about the feeding of marine mammals in US waters. The feeding of sea lions at west-coast haul out areas has resulted in numerous attacks on tourists. Similarly, illegal feeding of dolphins in the south-eastern United States has resulted in “people being bitten, swimmers being pulled under the water, and injuries severe enough to require stitches and hospitalization. In Brazil, a man who was harassing a wild dolphin was killed when the dolphin rammed him in the chest.” (Anonymous, 1995, p. 3). Orams, Hill, and Baglioni (1996) also reported on the risks of dolphins becoming aggressive as a result of regular provisioning.

Other marine wildlife has also become aggressive toward humans as a result of feeding. The common practice of fish feeding at a number of marine parks has resulted in a number of injuries to the feeders. For example, at Hanauma Bay in Hawaii, Moribe (2000) reported that the City and County of Honolulu lifeguards treated 4–5 visitors a day for injuries resulting from fish bites. More dramatically, Perrine (1989) reports that some divers feeding larger fishes, such as barracudas, moray eels, gropers and sharks have had fingers, earlobes, lips, faces and even arms injured and sometimes bitten off.

Birds are probably the most popular of all wildlife for people to feed. In fact, bird feeding is a huge business with a number of commercial outlets established to exclusively serve those who wish to establish bird feeding stations at home. Brittingham and Temple (1992) estimated that some 82 million Americans were

involved with feeding wild birds. While such activity is generally viewed as harmless, there have been cases of large birds, such as Cassowaries in Australia, attacking people for food (Crome and Moore, 1990). Attacks by smaller birds regularly fed—such as the Lorikeets at Currumbin Sanctuary in Queensland, Australia—are not uncommon (personal observation). It has also been shown that supplemental feeding can result in an increase in intra-species aggression. Aggression when obtaining food is not necessarily always directed at people—sometimes animals will attack one another and some may even injure themselves in attempting to rush in and obtain the food. Intra-species aggression is often influenced by the density of animals in an area. The higher densities induced by human provisioning leads to a higher frequency of interactions between con-specifics often resulting in more aggression.

3.4. *Health/disease/injury*

Surprisingly, there are few scientifically substantiated reports of negative consequences for the health and viability of provisioned animals. There are, however, a number of reports that imply or conclude that feeding wild animals is detrimental. For example, the offspring of provisioned dolphins at Monkey Mia in Western Australia suffer an extremely high mortality rate. Contact with human pathogens, decreased vigilance and protective behaviour from the mother and low nutritional value of the supplemental food are all suspected causes (Wilson 1994). Similarly Bryant (1994) states that illegally provisioned dolphins' nutritional health is at risk in Florida, as they may be fed non-natural food such as bananas and potato chips, as well as spoiled fish. Moribe (2000) summarises the concerns of local scientists and resource managers regarding the common practice of fish feeding at Hanauma Bay, Hawaii. They contend that there are negative physiological and possible genetic health (by promoting natural selection of the most aggressive fishes) consequences of the feeding. The Great Barrier Reef Marine Park Authority (1993) claims that fish that are fed inappropriate food—such as that typically provided by tourists—can result in an increase in fat deposits in the liver which can be fatal. Elsewhere in Australia it is commonly regarded that tourists' feeding of kangaroos is responsible for “lumpy jaw” disease and other health problems. Literature from Grampians National Park in Victoria, Australia, which attempts to discourage tourists from feeding kangaroos, illustrates this:

Bread, chops, sausages and other food are foreign to their digestive systems and cause health problems. Also, plastic, paper and other material can become stuck in their throats, leading to infection or choking.

Kangaroos are not adapted to eating processed human food. It causes severe health problems and commonly results in the early death of the animal (Burger, 1997, p. 6).

While such a statement may seem to be intuitively correct, in fact, there is no empirical research that proves this to be the case. What does seem clear, however, is that provisioned animals are at greater risk of injury as a result of their close encounters with humans. For example, the NMFS has become particularly concerned regarding injuries to dolphins in Florida.

NMFS is especially concerned about the increasing frequency of injuries and even deaths and changing behaviours amongst local-area dolphins which appear to be related to feeding and swimming with activities. As these animals lose their natural fear of humans, they become increasingly vulnerable to interactions and collisions with fishing and recreational vessels. They also become more reliant on begging for handouts instead of foraging. Reports of vandalism against dolphins have included people feeding dolphins beer, hot dogs, candy bars and baited fish hooks. (Anonymous, 1995, p. 3).

Despite such dramatic reports, there are few, if any, long-term empirical studies which prove that there are significant negative health consequences of feeding wildlife. This does not mean, however, that such negative consequences do not arise but rather is more likely related to the significant challenges that lie in demonstrating cause and effect issues with regard to health changes in wild populations.

4. What's the attraction for tourists?

Getting close to animals is an extremely popular mechanism whereby tourists can feel they are communing with nature. The demand for interaction with nature has been argued to be fundamentally important to humans (Hendee & Roggenbuck, 1984). In an increasingly urbanised world, many people now travel to “reconnect” with things natural. There is no doubt that the modern nature conservation movement and the increasing number of environmental-based media (for example, the growth of the “Discovery Channel” on television, as well as many environmental magazines, web-sites and movies) have contributed to this demand. A further contributing factor maybe the decreasing number of opportunities to interact with nature. The decline of high quality wilderness areas has been long recognised and well documented (Leopold, 1949). This rarity may contribute to the attraction as it does with many other rare “commodities” such as precious metals, art, stamps and even locations (for example, beach-front

properties). There is, therefore, a growing demand from tourists to interact with wildlife in the wild and, in particular, those animals that are unusual and/or endangered are especially targeted (Shackley, 1996). A further contributing factor is the increased number of wildlife-based tourism operators who are marketing the opportunities for interaction, for as Fabbri (1990, p. xiv) points out

...quite often in market-oriented economies, the demand tends to be a response to the offer. The more pressing the offer, the higher the demand...

Fabbri's point is well made. It is important to recognise that demand for interaction with wildlife in the wild is not a simple function of an inherently desired activity. Rather it is an outcome of a complex relationship between opportunity, image, perceived benefit, cost and history.

So, why do humans wish to feed wild animals? There are a wide variety of reasons—certainly the provisioning of wildlife allows the close viewing of animals which may otherwise be inaccessible for tourists. But, as, Burger (1997, p. 2) points out

Many people enjoy feeding animals for many different reasons ranging from the ability to see an animal close when usually they...will not allow a close encounter...to having company, relaxation and pleasure in seeing the parrots who regularly visit the back yard for a drink, a rest in the tree and some seed.

The sharing of food is something more complex and more fundamental for humans than simply a means of getting close to animals. The sharing of food is a fundamental part of human nature that has existed throughout history and across cultures. It provides a focus for religious ceremonies, it is often a basis for how humans form and maintain relationships, it is one of the main ways people celebrate and it is also a natural parenting response in all humans. So, for people, to share food is natural. It is not surprising therefore that the sharing of food with other animals is so popular.

While not specifically examining the role of food, many authors have alluded to the significant psychological and physical health benefits of interacting with wildlife for humans. Rowan and Beck (1994, p. 88) conclude

In sum, there is solid evidence that animal contact has significant health benefits and that it positively influences transient psychological states, morale, and feelings of self worth.

Furthermore, these authors argue that

There is some support for the idea that human-animal interactions benefit the animals as well as the

people...If social companionship is an evolutionary development, then it is only logical that both sides of the social interaction will benefit.

This perspective is certainly counter to the prevailing views of zoologists and resource managers who emphasise the negative implications of wildlife feeding. It should be pointed out, however, that tourists are not the only humans who feed wildlife. Scientists have utilised food provisioning as a means to obtain reliable behavioural data on difficult to observe species. Probably the most well known example of this was the classic study of chimpanzees conducted by Jane Goodall (1986) and colleagues at Gombe, Tanzania where provisioning was used to promote the habituation of the study subjects to close human proximity. Scientists have also, quite frequently, utilised deliberate provisioning as a means to manipulate natural communities to answer questions regarding the importance of food availability. Boutin (1990), for instance, reports on 138 such studies where food supply was manipulated in terrestrial vertebrate species. Humans do, of course, provision animals for a wide variety of other purposes. For example, as members of their families (household pets), as a mechanism for social interaction (feeding the ducks with grandchildren), as a vehicle for sport or recreation (horse racing, "show" animals), for conservation (to aid an injured animal) and for production (for human consumption). This range of purposes can be classified as a typology (Fig. 2).

The relationships between humans and other animals can also be viewed to have three different philosophically based states (Fig. 2). First is the basic Judeo-Christian view that animals are subordinate to humans and that, as a consequence, humans have the right to utilise animals for human benefit. This view is predominant in most western cultures today. A second alternate view is that animals have an equal or equivalent status to humans—they have rights and needs that should be afforded power or position in human decision making. The recent thinking of deep ecologists, animal rights activists and some eastern religions (at least for some animals) represents this kind of view. Third is a view of reverence where an animal is seen as superior—as when animals are worshipped as gods—and where people pay homage and make sacrifices to animals in order to invoke favour, good fortune, to pay penance or to ensure salvation. The spiritual element of many indigenous cultures represents this approach.

Thus, the feeding of wildlife as a tourism attraction occurs within a much broader context of human relationships with other animal species. What must be guarded against is the self-righteousness of one particular group who considers the feeding of animals to be always acceptable in one context and never in another.

| Philosophy | Orientation/Focus | Purpose | Typical settings and examples |
|--------------------------------|--------------------------|--|--|
| Animals as gods | <i>Spiritual</i> | Invoke favour Pay penance Ensure salvation | Shrines and effigies Sacrifices to the "gods" Ceremonies and special events |
| Animals as equals | <i>Deep Ecology</i> | Healthy functioning of "Gaia" and the natural world Higher morality | Co-operative hunting Sharing of the kill/harvest |
| Animals as subordinates | <i>Familial</i> | Expressions of caring Sense of belonging | Inclusion of family pets in family food rituals |
| | <i>Social</i> | Bonding Interaction Communication | Feeding of "tame" animals in a social context (eg. feeding ducks at local pond). |
| | <i>Recreational</i> | Sustenance of animals used for recreational and sporting activities | Equestrian facilities Horse racing "Show" animals |
| | <i>Tourism</i> | Permits close observation Experience unusual or exciting animals Education | Natural settings Captive settings (eg. zoos) |
| | <i>Scientific</i> | Answer questions related to food availability & diet Allow close observation | Laboratories Field study sites |
| | <i>Conservation</i> | To assist in the recovery of endangered species To promote recovery from injury or sickness | National parks and wildlife refuges To mitigate detrimental impacts of human activities |
| | <i>Production</i> | To promote growth of animals for human food To sustain animals used in human experiments | Farms and other animal husbandry facilities Medical and cosmetic research laboratories |

Fig. 2. Typology of human provisioning of food to other species.

There is no doubt that close relationships with animals have significant benefits for humans, for if this were not the case why would we do it? However, because food is so fundamental to life—it is an extremely powerful influence over the lives of others and thus the implications of food provisioning must be carefully considered. Just because it is fun to do and because we can do it does not mean we should. It is clear that risks and costs, particularly those of a longer-term consideration, must also be taken into account.

5. Management

A variety of strongly worded statements have been made by conservation agencies regarding the negative impacts of feeding of wildlife (Burger, 1997). However, as has been pointed out above, these statements are

seldom backed up by research. While it is, perhaps, understandable that conservation management agencies wish to take a precautionary approach, this does not discount the fact that in the great majority of cases the impacts of feeding wildlife are not known. Perhaps as a result, there is a wide variety of opinions and approaches to managing tourists' feeding of wild animals. However, management approaches can be categorised under three main classes.

5.1. Prohibition

The most common approach to managing wildlife feeding on publicly controlled land such as national parks and forests is to prohibit such practices. Such bans have proven to be extremely difficult to enforce and often have low levels of compliance. There are a variety of reasons for this. It is relatively common, for example,

to find that the feeding of wildlife is banned on publicly controlled land but promoted as a tourism attraction on neighbouring private facilities. There are also confusing approaches within public natural resource management agencies where, for example, many North American National Parks agencies prohibit the feeding of wildlife by visitors and yet “a relatively common management practice is to supply food to deer and elk during severe winters” (Boutin, 1990, p. 216). It is also confusing (for tourists) when a prohibition has variable enforcement. It seems common, for instance, for resource management agencies in different parts of the world to aggressively enforce bans on feeding of large mammals such as bears, dolphins and monkeys but ignore the commonplace feeding of birds and fish and at the same locations (personal observation). Mixed messages are also given to tourists (or potential tourists) when despite management agency prohibition they see the feeding of wildlife promoted in advertising and on television. An example is the “Kea” in New Zealand. These mountain parrots are often featured in the media being fed by tourists (personal observation)—and yet New Zealand’s Department of Conservation is actively trying to discourage the practice.

The confusing messages given to the public via the media and the difficulties in implementing regulations banning food provisioning is frustrating for natural resource managers. A common response is for the agency to implement an aggressive education/interpretation programme to inform visitors of the ban and the reasons for its existence. These programmes typically utilise strong language and “paint” the results of feeding wildlife in extremely negative terms. In doing so they often “stretch” the truth with regard to what is really known about the impacts of wildlife feeding. Signs in Grampian National Park in Australia, for example, outline the prohibition on feeding kangaroos and claim that “it causes severe health problems and commonly results in the early death of the animal”. Such claims are unsubstantiated by research (Burger, 1997) and simplify the complexity of the issue. It is, of course, understandable that management agencies choose to present the issue this way, they are, after all, attempting to persuade people to “do the right thing”. What it does show is that Burger’s (1997, p. 5) conclusion that “the subject of feeding wildlife is very complex and one which managers and interested groups have been given minimal, if any, scientific information about” is quite correct.

5.2. *Manage*

A second type of approach in managing the feeding of wildlife can be categorised as “actively managing” the interaction. These approaches permit the feeding of wildlife but do so under (usually) tightly controlled

conditions. These conditions attempt to minimise the potential risks associated with the feeding of wildlife by ensuring, in the first instance, that such practices are based upon an understanding of the potential impacts of the feeding on the animals and for the tourists. Currumbin Bird Sanctuary on Australia’s Gold Coast, for example, has been feeding wild Rainbow Lorikeets (a small parrot) since the 1940s. These feeding sessions are closely controlled by trained staff. The food provided is a mixture developed to prevent dietary deficiency (Cannon, 1979) and food receptacles are disinfected prior to and after use. In addition, an interpretation programme is delivered to tourists during the feeding sessions. Staff at the sanctuary also monitor the numbers and health of the birds as well as support research (Burger, 1997). Public resource management agencies have also adopted active management approaches to tourist feeding. As a response to the increasing popularity of the practice, the Great Barrier Reef Marine Park Authority decided to develop guidelines for the feeding of fish by tourists on the reef. These guidelines permit commercial tour operators to feed fish at designated feeding sites, require appropriate food types, restrict food amounts and require education programmes for tourists that include information about the dangers of feeding fish (Great Barrier Reef Marine Park Authority, 1994).

A novel approach to management is provided in Australia’s Northern Territory where a commercial tourism operator is permitted to feed salt-water crocodiles on the Adelaide River (Ryan, 1998). It is argued that this opportunity reduces the previously unregulated and dangerous activities of tourists who rented small boats and attempted to feed the crocodiles (Webb, 1997).

5.3. *Ignore*

There are a wide variety of locations where tourist feeding of wildlife is actively promoted but where no management regime exists. In effect, the issue is ignored by management agencies. Examples are numerous and include (all personal observation): the feeding of stingrays in the Cayman Islands, shark feeding in the Bahamas, fish feeding at marine reserves in New Zealand, the use of bird-feeders on recreational vehicles in North American national parks, the feeding of vervet monkeys in parks in South Africa, feral cats in Florida State Parks and reef fish in Brazil.

Thus, management approaches vary from simple prohibition to active management to ignoring the issue entirely. This diversity of approaches is likely to be related to the complexity of the issue and the difficulties in determining the outcome of these practices. Additionally, of course, it is related to human interest in getting close to and interacting with wild animals and,

perhaps, human short-sightedness and self-interest. Given the growth of wildlife tourism and the increasing concern over the impacts of such activities (Shackley, 1996), it will become increasingly important for nature-tourists, tourism brokers and management agencies to carefully assess the impacts of their practices on the host natural community and to take action accordingly.

6. Conclusions

The review presented above shows that the feeding of wildlife by humans is a controversial issue. In some cases, it is an activity fraught with danger—both for the wildlife and in many cases for the tourists themselves. In others, it provides significant social, economic and even environmental benefits. However, with the obvious exceptions of deliberate feeding to aid in the rehabilitation of injured or sick animals and the use of supplemental feeding to aid the recovery of an endangered species, it is difficult to find any biological justification for the feeding of wildlife. Despite a widespread understanding of the risks associated with feeding and the prohibition of such feeding in almost every national park and other types of wildlife refuges, the practice remains popular. There are, of course, arguments that can be made with regard to the psychological and economic benefits that accrue to individuals and communities as a result of these activities. Certainly, many people enjoy close encounters with wild animals—is this justification for the significant risks associated with such actions? The answer depends on one's view of the world—animal rights/welfare advocates would, of course, argue that it is not. This view (see Singer, 1990) holds that the exploitation of wildlife for human entertainment and enjoyment is not "right". A more pragmatic viewpoint would argue that the utilisation of wildlife for human enjoyment is universal. We do, after all, use them as a source of food, deliberately breed them for human companions, use them as targets (literally) for sports such as hunting, we even cage animals in facilities for our entertainment (as in zoos). For, as Mithen (1999, p. 195) states in his review of the historical relationships between humans and animals:

People have a remarkably rich and varied set of relationships with animals: we use them for food and for sport; we use them as companions and loved ones; we use them to entertain and to educate us.

The ethics surrounding human utilisation of animals is a topic of major debate—and not one that needs to be reviewed in detail here. Nevertheless, it is important to realise that the issue of feeding wildlife as a tourism attraction lies within a much broader realm of debates on humans' relationships with the natural environment.

Why then are there such conflicting and inconsistent views when it comes to the issue of feeding wildlife? For some animals and in some settings, it seems widely accepted and yet in others many, particularly biologists and resource managers, are vehemently opposed to it. The answer lies in understanding human nature. Humans are complex animals with varying views of the world and varying motivations. One of these points of view is that there should be some circumstances where nature is left to be as uninfluenced by humans as possible. This, after all, is the basic premise of the national park's concept. People accept that in the heavily human influenced area of the Spectrum of Tourist Wildlife Interaction Opportunities (Fig. 1)—such as in the captive and semi-captive realms—that human provisioning occurs. Where it becomes objectionable for many is in the gradual creep of these kinds of approaches into the few remaining vestiges of the uninfluenced natural world. The argument that there should be some places and some experiences that remain sacred from human influence, as much as is possible, is a good one. The feeding of wildlife in natural settings to simply facilitate interaction with tourists is a corruption of this philosophy and that is probably the real reason that the feeding of wildlife is such an emotional issue so vehemently opposed by some. Despite one's view on the subject what can, and should be concluded, is that humans have an obligation to consider the impacts of their actions. In the case of feeding wildlife, it is obvious that there are significant risks. As a consequence, if such activities are permitted they should only be done so with careful consideration and an obligation to accept the implications and impacts of those activities. For as Shepard (1996, p. 332) states in his thought provoking letter from "The Others" (animals) to humans:

As slaves we stay close. As something to "pet" and to speak to, someone to be there and to need them, to be their first lesson in otherness, we have shared their homes for ten thousand years. They have made that tie a bond. From the private home we have gone out to the wounded and lonely, yearning for unqualified devotion—to hospitals, hospices, homes for the aged, wards of the sick, the enclaves of the handicapped and retarded. We now elicit speech from the autistic and trust from those in prison. All that is well enough, but it involves only our minimal, domesticated selves, not our wild and perfect forms. It smells of dependency.

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