An appetite for connection: why we need to understand the impact and value of feeding wild birds

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Birds and people

Birds and people have had a long and passionate relationship of great depth and complexity. Beyond utilitarian uses such as providing food and feathers, birds feature in the religious, ceremonial and spiritual dimensions of many societies. Many are revered as totems and gods, feared as spirits and demonic messengers, and valued as symbols and exemplars (Sax 2007; Weidensaul 2007). More prosaically, huge numbers of people, from all walks of life throughout the world, seek birds, not to worship or hunt but 'simply' to watch. Bird watching appears to be the largest nature-based pastime in the world and the number of participants continues to increase (Jones and Buckley 2001, Cordell and Herbert 2002). The ubiquity and scale of this activity has lead to considerable research attention, with environmental psychologists exploring knowledge of birds as indicators of ecological awareness, resource economists and tourism researchers revealing the scale and significance of bird-watching as an industry, while sociologists expand on the cultural meanings of birds in different settings (see e.g. Rhode and Kendell 1994; Shultz 2000; Birkhead 2008; Green and Jones 2010).

While there is no denying the scale and importance of bird-watching, there is another facet of the human-bird relationship that is even more common and certainly more intimate: the virtually universal practice of feeding wild birds. Although attracting birds by the provision of food is probably the most widespread and popular form of human-wildlife interaction throughout the world (Fuller *et al.* 2008; Robb *et al.* 2008), remarkably little is known about the practice (Jones and Reynolds 2008). This lack of reliable knowledge is becoming increasingly important. In Australia, concerns about the implications and impacts of feeding have resulted in a widely acknowledged but largely unofficial opposition to the practice. This contrasts with the U.S. and U.K. where most bird and conservation organisations actively promote the practice as an important conservation activity (Toms 2003; CLO 2011). Both the promotion and opposition to

feeding are, however, based on alarmingly little evidence and also tend to ignore the considerable complexity of this multidimensional phenomenon (Fuller *et al.* 2008).

The apparently longer history and the far more overt practice of feeding in the Northern Hemisphere seems to relate to its origins as humane response to the plight of hungry birds during winter (Weidensaul 2007). Well-publicised 'hard winters' in the early Twentieth Century, during which thousands of birds were found frozen to death in city streets, seem to have given impetus to mass 'outreach to the birds' movements in the U.S. (Goodwin 1978). From these important emotional origins has developed a massive industry, with poorly understood but likely profound influences over large areas (Robb *et al.* 2008). In the U.K., for example, the survival of several species appears to be sustained at least in part by the provision of seed (Sterry and Toms 2008). The general approval of the practice in the Northern Hemisphere has also resulted in clear and practical advice for feeders. An abundance of sources provide detailed information on how and what to feed and the provide guidelines on best practice (e.g., Burton and Holden 2003; National Bird-Feeding Society 2011; see Table 1). In contrast, those feeding birds in Australia, though numerous and located throughout the country (ABC 2011) have largely operated as a free agents (Howard 2006), many aware of the apparent stigma their hobby but passionately committed to 'their' birds anyway (Jones and Howard 2006). Accepting such desire and motivation on the part of the people so engaged is an important component in attempts to understand the impact and implications of this important and intimate relationship (Ishigame and Baxter 2007; Cocker 2010). It is time to acknowledge that wild bird feeding is an important activity for large numbers of people, that the practice may be a significant form of connecting with nature and, that, frankly, it is here to stay. Equally, we need to recognise that the ecological and conservation dimensions of the phenomena are vastly different to those of the Northern Hemisphere and that the ecological implications and impacts are likely to be very different. For all these reasons, it is time to take feeding seriously.

Wild bird feeding: here and there

Globally, provisioning wild birds is occurring on a colossal scale. In the Northern Hemisphere numerous surveys of participation rates have found 34-75% of households in the US and UK were engaged in the practice (Cowie and Hinsley 1988; Rogers 2002; US Dept. Interior, Fish and Wildlife Service 2002). This activity is explicitly endorsed by organisations such as the British Trust for Ornithology (BTO), the Royal Society for the Protection of Birds (RSPB) and the Cornell Laboratory of Ornithology (CLO), who

actively promote feeding as a 'positive investment in the survival of our birds' (e.g., RSBP 2007; Sterry and Toms 2008). The result is a massive, global birdseed and peripherals industry estimated to be worth hundreds of millions of dollars. In the US during 2002, about 82 million householders distributed over 450 million kg of seed (US Dept. Interior, Fish and Wildlife Service 2002); the latest estimation of value of the industry in that country was US\$4.5 billion annually (Fair 2006). In the U.K., recent estimates suggest that British feeders outlay £240-290 million each year on seed, dispensers and other peripherals (Jones and Reynolds 2008). Importantly, the practice of feeding is thoroughly dominated by the use of a relatively small number of seed types; although still frequently used, home-made suet (fat) balls, bird 'puddings' and sugar-water mixtures are minor components of the overall smorgasbord (Toms 2008).

In Australia, many would view the scale of this phenomenon with astonishment and possibly alarm (Seipen and Stanley 1996; Petrie *et al.* 2003). Certainly, a clear anti-feeding sentiment among wildlife and conservation agencies and birding organisations is strongly evident and widely acknowledged in Australia (Howard and Jones 2004; Ishigame and Baxter 2007; Jones 2008). Although the principal focus of this opposition has been on feeding in reserves and parks (Orams 2002), several agencies have seriously contemplated banning even domestic feeding (D. Jones unpublished data). Just why this widespread opposition has developed here remains a minor mystery (Howard 2006) but would repay a careful historical investigation.

In reality, and despite considerable discouragement and censure, participation rates in Australia are virtually identical to those of the rest of the world: a series of studies have consistently found levels between 38% and 57% from all corners of the country (Rollinson *et al.* 2003; Howard and Jones 2004; Ishigame and Baxter 2007). An appreciation of the popularity – and durability - of this interaction in Australia has recently resulted in preliminary discussions on guidelines for feeding (Plant 2008), as well as on alternatives such as attracting birds through garden design (Parsons 2008). However, significant concerns remain.

Should we be worried?

One of the reasons that many are concerned is that the practice of feeding has been associated with an alarming array of impacts on the birds and the environment more generally (Green and Higginbottom 2000; Orams 2002). These include the spread of disease, nutritional imbalances, enhancement of introduced or unpopular species, increased aggression, the creation of 'ecological traps', increases in unpopular species

including vermin and, most frequently mentioned, the possibility of dependency on anthropogenic foods (Anderson *et al.* 1997; O’Leary and Jones 2006). (Only some of these are mentioned here; see Orams (2002), Ishigame *et al.* (2006) and Fuller *et al.* (2008) for further discussion). These negatives are countered by proponents who point out that feeding birds has many benefits such as the improved survival of overwintering birds, enhancement of certain threatened populations, and an increase in general environmental awareness among people who feed birds (e.g., see Burton and Holden 2003; Sterry and Toms 2008).

A sober assessment of the available evidence for each of these points – both negative and positive - quickly stalls, however, because of the lack of reliable empirical evidence (Jones and Reynolds 2008). Whilst there are endless anecdotes relating to a particular issue, many of the published studies are often too localised to allow useful extrapolation. Important exceptions to such generalisations are studies of several avian diseases whose spread has been implicated in feeder use. The best known of these was the conjunctivitis epidemic among American House Finches (*Carpodacus mexicanus*) in the eastern U.S., a phenomenon initially reported among birds visiting feeders (Dhondt *et al.* 2001). The subsequent monitoring of the disease’s spread was achieved by recruiting large numbers of feeder operators in one of the most effective examples of large-scale ‘citizen science’ (Hochachka and Dhondt 2000). This army of motivated participants enabled researchers to follow the outbreak through its peak around 2004 (when about 15% of the eastern population of House Finches were infected) and through the later ‘plateaux’ phase (CLO 2010). The House Finch Disease Project was wound up in 2009 with advice that included the statement: “Feeding birds may not necessarily increase the rate of disease spread” (CLO 2010), a view that reflects the acute sensitivity to inferring possible impacts of feeder use in the U.S. (see especially the reaction to a controversial article in the *Wall Street Journal* (Sterba 2002; Erickson 2003).

Remarkably similar characteristics surround the discovery and monitoring of the protozoan disease *Trichomoniasis gallinae* in the U.K., which was declared an epidemic in 2005 (Robinson *et al.* 2010). Unlike the conjunctivitis, *Trichomoniasis* is fatal for most infected Greenfinch (*Carduelis chloris*) and Chaffinch (*Fringilla coelebs*), and has resulted in declines of 35% and 21% respectively of affected populations between 2007 and 2009 in the U.K. (Robinson *et al.* 2010). Again, the role of feeders appeared to be somewhat equivocal; while there is no doubt that infections are more likely due to the cramming of birds at feeding stations, the highly gregarious social

behaviour of the two main species suggested that any infection was likely to spread quickly. Less social British finches, though also susceptible, have been far less impacted (Robinson *et al.* 2010). *Trichomoniasis* has often been detected in wild populations of many species, but outbreaks appear to have short durations (Real *et al.* 2000). Nonetheless, one such event in California in 2006 among native Band-tailed Pigeons (*Patagioena fasciata*) and Morning Doves (*Zenaida macroura*) led to a rare call for a temporary cessation of feeding by wildlife authorities (California Dept. Fish and Game 2006). Thankfully to date, no similar feeder-related epidemics have occurred in Australia although there is considerable potential for such a phenomenon. Certainly, the sporadic detection of Psittacine Beak and Feather Disease among cockatoos and lorikeets, as well as Clostridia, has been frequently provided cause for concern; such outbreaks have been cited as reasons for the banning of feeding (N.S.W. N.P.W.S. 2003). Despite these rather dramatic examples mentioned above, the rarity of such events emphasises that there is little evidence for a clear role for feeder use in disease transmission.

A significant feature of bird feeding as practiced in Australia is the heavy provision of meat as the main food source (Rollinson *et al.* 2003). With larger, predatory birds such as Australian Magpies (*Cracticus tibicen*), butcherbirds (*Cracticus* spp.) and Pied Currawongs (*Strepera graculina*) being among the most frequent – and mainly favoured – visitors to feeding stations (Rollinson *et al.* 2003, Ishigame and Baxter 2007), a wide variety of meats such as mince, sausage and organs, are used to attract these species. This raised several issues: disease risk associated with the communal feeding, the potential for bacterial spread due to feeding on raw meats, as well as the potential nutritional impact of heavy use of fatty processed foods. Unfortunately, we know very little about any of these issues although one experimental study of captive Magpies found consistently raised cholesterol levels in birds eating a diet of processed sausage meat (Ishigame *et al.* 2006).

Feeding really does change things

Whilst little is known about the negative effects of feeding birds on their ecosystems, the fundamental influence of food supply on the lives of animals has long been appreciated, largely through many carefully conducted supplementary feeding experiments, (see Martin 1987; Robb *et al.* 2008). These studies have explored, for example, the influence of the timing, quantity and quality of food provisioning on hatching and laying dates, clutch size, and chick and fledging survival (Boutin 1990; Newton 1998). This work on a

huge variety of species means that we can now be reasonably certain about some important likely outcomes of bird feeding. First, over-wintering birds supplied with additional foods have greatly enhanced survival, and second, food supplementation almost always advances the key reproduction dates: egg laying, hatching, fledgling and, often, re-nesting (Chamberlain *et al.* 2005; Fuller *et al.* 2008). Thus, supplemented birds typically breed earlier and more often. However, evidence for direct benefits to fitness, such as producing larger clutches and enhancing hatching survival is far less obvious (Robb *et al.* 2008). In an important recent experiment conducted in the U.K., Great Tits (*Parus major*) and Blue Tits (*Cyanistes caeruleus*) were provided with supplementary foods over three consecutive breeding seasons (Harrison *et al.* 2010). This unusually long duration for the experiment found that while laying date and incubation duration were reduced as expected, clutch sizes and hatching success were actually lower. The importance of these findings, acknowledged directly by the researchers (Harrison *et al.* 2010), was that these breeding parameters closely resembled what had been noted among urban populations of several species of British birds, many of which habitually use feeders (Chamberlain *et al.* 2009). Given the assumption that feeders enhance urban bird populations, these are sobering discoveries, although the mechanisms are far from being understood.

Beyond the possible influences on the breeding outcomes for the species being fed, it is also important to consider which species are the main beneficiaries of the provisions. In most cases, this is all too self-evident: those bold enough to access the feeders. While there are always local exceptions, most birds utilising these sources of food are those already common (Cannon *et al.* 2005; Parsons *et al.* 2006). In urban areas such species are, by necessity, those that have become habituated to the presence and activities of people (Chace and Walsh 2006); species unable to tolerate or accommodate human-dominated environments tend to have disappeared long ago (Chamberlain *et al.* 2005). Indeed, Fuller *et al.* (2008) has recently demonstrated that garden bird feeding in the U.K. greatly enhance the abundance of local feeder-using species but did not influence species richness: more birds but not more species.

It is also important to take a broader perspective, beyond the feeding table. Anthropogenic influences are also implicated in the dramatic increases in a range of species that are rarely intentionally fed. Corvid populations, for example, are continuing to expand throughout the world, almost certainly due to the relative easy of access to a variety of anthropogenic foods including an abundance of discarded waste and road-kill (Marzluff and Angell 2007). In Australia, virtually every large city has experienced

massive increases in the number of Rainbow Lorikeets (*Trichoglossus haematodus*), a trend attributed to the popularity of nectar-bearing shrubs and trees being planted in suburban gardens (White *et al.* 2005). The same food source appears to be enhancing the well-known impacts of Noisy Miners (*Manorina melanocephala*). Similar examples abound, all with a familiar lesson: even good intentions can have unexpected influences (see Catterall 2004). Could feeding also be implicated in enhancing populations of such species to the detriment of others?

The decline in avian biodiversity is of profound concern to most of us, and the possibility that a human activity as common as feeding may be implicated is alarming. This seemingly logical connection, however obvious and tempting to make, is, however, far from linear. The dramatic changes in abundances among urban species have been well documented (e.g., Low 2001; Catterall 2004) although the influences at play are proving to be difficult to untangle (Major *et al.* 2001). Perhaps the most pertinent such example of unexpected findings concerns the issue of dependency, the number one concern of both proponents and opponents alike (Howard and Jones 2004): with so much human-provided food so easily available, it is argued that many birds must surely be becoming reliant on this food, perhaps even losing their natural foraging skills. Thus, the widely publicised 'Golden Rule' of feeding: once you start, don't stop (e.g., RSPB 2007). However, a number of recent studies looking specifically at this issue have found that a variety of species (including suburban Australian Magpies, British Tits and Florida Scrub-jays (*Aphelocoma coerulescens*)(Cowie and Hinsley 1988; Fleisher *et al.* 2003; O'Leary and Jones 2006)), all with easy access to anthropogenic foods, used only small proportions of this food, especially when feeding their chicks. Most impressive of all, a population of North American Black-capped Chickadees (*Poecile atricapillus*) studied over several harsh winters in Maine showed no dependency on feeders and survived even when the feeders were suddenly withdrawn (Brittingham and Temple 1992).

One of the generalisations that can be drawn from such studies is that many species appear to be far more discerning than expected in terms of the types and amounts of foods utilised (Chapman and Jones 2009). On the other hand, many of the foods exploited by urban birds are designed to be easily digestible; a few fatty chips or slices of salami may have a disproportionate dietary impact than a far greater amount of natural foods (Ottoni *et al.* 2009). In a Tasmanian study, Silver Gulls (*Larus novaehollandiae*) consuming a large proportion of human foods in their diet tended to be heavier on average than those with a mainly natural diet (Auman *et al.* 2008). Similar findings have been associated with specific sites where supplementary foods have been

used to attract certain species for easy viewing (Orams 2002). Interesting, it is becoming clear that such sites are often monopolised by a small number of behaviourally dominant individuals, who obtain a disproportionate amount of the food being offered (Chapman and Jones 2010, *in press*). Thus, any adverse impacts attributable to the foods may be being concentrated in a few animals, potentially limiting the risks to the local population.

Enhancing the connection

Although the examples provided here suggest that we are starting to understand some specific aspects of the practice, they also demonstrate how little we really know about so complex and so common a phenomenon as wild bird feeding. While we can begin to form reliable perspectives on a range of physiological, ecological and behavioural facets of the practice, we remain remarkably uncertain about one of the most fundamental questions associated with feeding: why do people feed birds? Although there are numerous seemingly obvious reasons – pleasure, providing food, enjoying their company, bring them closer to observe, etc – I am aware of only two studies which have delved deeper in attempt to discern aspects of the motivation for providing food for other species. In the first, Peter Howard asked feeders to express this motivation in their own words (Howard and Jones 2004; Howard 2006). As well as confirming the expected reasons listed above, many feeders also stated that they fed birds for various ethical or moral reasons, a typical response being paraphrased as ‘Humans have done so much damage to the nature, I am trying to give something back’. Such perspectives strongly suggest a far more diverse and profound dimensions to the seemingly simple practice of feeding that may have been suspected. They also emphasise the importance of investigating how birds are ‘valued’ in Australia, a task recently commenced by Ainsworth *et al.* (2010).

The second study, Schrieber (2010), recently completed in the U.K. discerned remarkably similar motivations to those of the Australia respondents to Howard and Jones (2004), despite the differing conditions and species. While the emotional attachment was obvious, U.K. feeders expressed strong feeling of ‘protection’ and ‘attachment’; people were committed to providing assistance and care for ‘their’ birds.

Bird feeding is also worthy of a far greater level of attention for the fundamental reason that it is one of the principal forms of human-wildlife interaction in the contemporary world. For increasing numbers of urban dwellers, the main venue of any interaction with wild animals will be with the birds they encounter within the suburban

environments in which they live (Miller and Hobbs 2002). For many, a simple visitation by a Lorikeet or Magpie may represent a vital link with the natural world; ‘commonness’ need not be dismissed as simply ‘common’ (Gaston and Fuller 2007). For others, ‘their’ backyard birds represent a critical indication of how nature is coping with the human onslaught. And they are right: having long abandoned the city as a lost cause, ecologists are now discovering urban areas as rich, diverse and dynamic ecosystems with the study of urban environments rapidly becoming prominent in the vibrant emerging field of urban ecology (Hostetler 1999; McDonnell *et al.* 2009).

One of the key incentives for these attempts to understand the urban ecosystem is the recognition that this is the environment in which increasing numbers of us actually live (Miller and Hobbs 2002). Exploring the implications of human actions for other species is especially vital when the effects may be occurring literally in our own backyard. Conducting research in cities and suburbs is not, however, for the faint-hearted. As well as the innumerable logistical challenges of working in a human-dominated landscape, the presence of all those often opinionated, frequently motivated, people can be bewildering. But it is also an immense opportunity. By carefully recruiting the interest and time of huge numbers of urban residents in reporting the birds in local areas, programs such as *Project FeederWatch* in the U.S. (CLO 2010) and *Garden BirdWatch* in the U.K. (BTO 2011) have provided information of inestimable importance (Sterry and Toms 2008). Birds Australia’s own version, *Birds in Backyards*, is currently underway (Birds Australia 2011) while Canberra’s Garden Bird Survey recently completed 25 years (COG 2011). The scale, detail and coverage of this largely volunteer labour-force could never be replicated by even the most organised research group (Silvertown 2009). The numerous bird atlasing projects, almost all conducted entirely by armies of volunteers, are excellent examples of what can be achieved by ‘citizen scientists’ (Dunn and Weston 2008). These unpaid (and sometimes, paying) devotees are dramatically improving the precision of our understanding of processes such as changing distributions and the timing of migrations (see e.g., Chamberlain *et al.* 2005). And while there are legitimate concerns about the quality of the data collected (Cohn 2008), there are equally good examples of how such limitations can be addressed (CLO 2009) and how the volunteers can be recruited and retained (Wolcott *et al.* 2008).

An appreciation of the large numbers of people actively engaged in wild bird feeding – and by people intrinsically motivated (Howard and Jones 2004) – suggests that feeders could represent a valuable pool of potential citizen scientists, as already recognised elsewhere (e.g., see Dhondt *et al.* 2001; Harrison *et al.* 2010). Indeed, by their

involvement in this pastime, some participants, at least, appear to confirm to the attributes necessary to ensure high levels of reliable data collection (see Silvertown 2009; Mulder *et al.* 2010): commitment, previous experience in long-term projects, and a strong degree of personal interest in the study subjects. If the issues discussed in this article are as important as proposed, the time is right to begin a partnership with this unusually well-suited co-workers.

It's time

The phenomenon of wild bird-feeding in Australia is both immensely popular and its ecological impact is poorly understood. Given the scale of the practice, its ecological influence may be significant on many levels; populations, nutrition, disease, interspecific competition, and others. Similarly, the implications for the people involved may be considerable, potentially promoting general environmental awareness, or even more profound values of connectedness with nature (Miller and Hobbs 2002, Louv 2005). Maybe, but at present, we simply cannot say much with certainty. Nonetheless, what is clear from the few studies so far completed is that the people feeding birds are passionately engaged, and care deeply about the welfare of 'their' birds. In any pursuit, such devotion typically fosters a desire for further information and guidance. Currently, bird feeders in Australia know that there is no point in seeking such advice; none exists locally and almost all information from other countries simply does not apply here. The result is that, every day, thousands of sincerely concerned people provide food for birds without advice or guidance and many worry about whether they are may be harming the birds they care about deeply (Howard and Jones, Howard 2006). Some resources are available to give some pointers as to best practice when feeding Australian birds (Plant 2008, 2010), but empirical studies are urgently required to assess the effects of large-scale feeding on the populations on the birds that live among us. People will continue to attract bird to their backyards with foods. It's time to understand how they can do so with maximum benefit and minimum harm.

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Table 1. An small sample of the many on-line sources of information, advice and opinion on wild bird feeding for a limited number of countries, including some major Citizen Science projects.

Country	URL and notes
Australia	http://www.birdsinbackyards.net/ Birds Australia's Birds In Backyards Project website http://canberrabirds.org.au/ Site for information on the long-running Canberra Garden Bird Survey http://www.parks.tas.gov.au/index.aspx?base=2980 Parks Tasmania's 'Keeping Wildlife Wild' programme http://www.nzbirds.com/more/feed.html
New Zealand	New Zealand Birds' website with advice on feeding http://www.landcareresearch.co.nz/research/biocons/gardenbird/ Key government agency <i>Landcare Research</i> Garden Bird Survey website http://www.birds.cornell.edu/page.aspx?pid=1664
United States	Cornell Laboratory of Ornithology (CLO) Citizen Science pages http://www.birds.cornell.edu/pfw/ CLO Project FeederWatch http://www.eastbaynature.com/tips.htm One of numerous U.S. sites promoting feeding and providing information http://www.birdfeeding.org/ National Bird-Feeding Society, the major organization associated with feeding http://forums.gardenweb.com/forums/load/wildlife/ An important US site for debate over the pros and cons of feeding http://www.rspb.org.uk/advice/helpingbirds/feeding/
United Kingdom	http://www.rspb.org.uk/advice/helpingbirds/feeding/ Royal Society for the Protection of Birds site for feeding advice

<http://www.bto.org/volunteer-surveys/gbw>

The British Trust for Ornithology's Garden BirdWatch site

<http://www.ufaw.org.uk/gbhi.php>

Universities Federation for Animal Welfare site for the
Garden Birds Health Initiative.