

# animal welfare science update

The aim of the animal welfare science update is to keep you informed of developments in animal welfare science relating to the work of the RSPCA. The update provides summaries of the most relevant scientific papers and reports received by the RSPCA Australia office in the past quarter.

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## Announcing the RSPCA Australia Knowledgebase



*What should I feed my cat?*

*How is animal research controlled?*

*Is it legal to keep wildlife as pets?*

*What is halal slaughter?*

*What does the RSPCA think about rodeos?*

If you have a public enquiry to deal with, or your own question about animal welfare or the RSPCA's position on a particular issue, the place to go is the new RSPCA Australia knowledgebase. The knowledgebase provides straightforward and sensible answers to common animal welfare questions and is now available to the public via the RSPCA Australia website or direct from [kb.rspca.org.au](http://kb.rspca.org.au). If the answer to your question isn't there, please tell us. You can also post comments on the site if you have information of your own which we could add.

## reviews

### Elephants and ethics: Toward a morality of coexistence

Guest review by Peter Stroud, Zoological Consultant, Melbourne ([peter@zootica.com](mailto:peter@zootica.com))

How should we treat elephants? What makes elephants special? Should we keep elephants in zoos and circuses? These questions were addressed in a symposium titled "Never Forgetting - Elephants and Ethics", held at the Smithsonian's National Zoological Park Conservation and Research Centre in March 2003. *Elephants and ethics: toward a morality of coexistence* is not quite the proceedings of that symposium, but rather a series of essays by symposium participants and some others, around the "history of human-elephant relations" and issues of "vital concern to elephant welfare." Among the contributors are experts in elephant biology, zoo and circus managers, veterinarians, philosophers and welfare activists. All of the contributions are interesting and relevant to the debate in Australia about captive-elephant welfare.

A clear view of what elephants actually are is presented by Joyce Poole and Cynthia Moss, two field researchers who probably know more about African elephants than any other two people alive. Their essay on elephant sociality and complexity, might have served as a valuable introduction to this volume, setting the scene with a description of the things that make an elephant an elephant.

Gary Varner, from the Philosophy Department at Texas A&M University writes lucidly about the idea of "personhood" in elephants - whether they have particular characteristics that together are deserving of special consideration. Varner's conclusion that elephants "seem to be able to thrive under human control" is startlingly at variance with much of the evidence presented elsewhere, notably in "Most zoos do not deserve elephants", by David Hancocks. We need a clear eye in assessing zoo and circus practices. Furthermore, Dhriti K. Lahiri Choudhury's description of "Historical patterns of capture and management" of elephants in India shows that there is no place for a romanticized view of the ancient traditions of captive elephant management.

Also providing a vitally important insight from Asia is "Giants in chains: history, biology and preservation of Asian elephants in captivity", by Fred Kurt, Khyne U Mar and Marion E. Garai. Around 30% (15,000) of all Asian elephants are held in captivity but, of these, less than a thousand are held in zoos and circuses. All of the rest are captive in "elephant range countries", and a remarkable 60% (around 9000) of these are

still managed “extensively”, living in social groups with some access to wild habitat and sometimes to wild elephants. Here may be the real key to the conservation of the species, because these elephants enjoy reasonably naturalistic conditions and breed quite readily when allowed.

Curiously, despite the title of this volume, there is relatively little direct discussion of ethical issues - the moral principles, the rights and wrongs of how we should treat elephants. One very valuable essay, by Lori Alward, titled “Why circuses are unsuited to elephants”, compares and contrasts different theories for deriving ethical principles, and concludes that the “Capabilities Approach” can use science to help us determine what constitutes “a worthy life” for an animal, considering its characteristics and the life it has evolved to lead. This approach would seem to resonate strongly with the reported unanimous view of contributors to *Elephants and ethics*: that “wild biology” should be the reference for deriving criteria to assess captive welfare. There is a useful thread here, but curiously, it seems that the editors of this volume have avoided picking it up.

*Elephants and ethics* therefore leaves us with a jumble of ideas and points of view but no attempt at synthesis. Here is much to entertain and inform, and a little, but not enough, to actually throw real light on the question of how we might learn to live with elephants in an appropriately respectful and considerate way.

Wemmer, C. & Christen, C.A. (eds) (2008) *Elephants and ethics: Toward a morality of coexistence*. The John Hopkins University Press, Baltimore, USA.

## **An elephant in the room: The science and well-being of elephants in captivity**

Guest review by [Brigitta Wimmer](#)

The idea for this book arose from a 2006 Symposium held by the Coalition for Captive Elephant Wellbeing, a group of experts committed to improving the care of captive elephants. The group saw the need to bring together, in one text, in-depth assessments of the requirements and management of elephants with the aim of providing a better understanding of their needs as a species and encouraging people to take a holistic approach to their management.

The authors present what they believe to be vital factors for arriving at a better understanding of - and therefore improvement in - the keeping of elephants in captivity. Different chapters deal with the physical, health, mental and social environments necessary for the wellbeing of elephants and examine current as well as potential new directions for zoos. One of the key themes is the investigation of an elephant’s life in the wild and how such a large, long-lived and intelligent animal evolved to become a successful species. Elephants have an outstanding mental capacity to cope and adapt to different challenges, something that humans have taken much advantage of. In the process of captivity, we have limited their movements, restricted their social networks, underestimated the need to exercise their mental capabilities and promoted ‘conservation’ efforts that have centred on captive breeding at the expense of contributing to their survival in situ. In an attempt to address these problems, this book presents a set of optimal conditions and best practice guidelines for captive elephants. These give clear directions and tools to strive for a type of captive management where elephants could express their full range of behaviour and activities.

Though the authors are deeply concerned about the welfare of elephants in captivity, they have presented objective contributions that aim to ameliorate the conditions under which elephants are kept. In recent times zoos have tended to justify the keeping of elephants in the name of conservation. They claim a valuable role in contributing to the persistence of elephants in the wild through captive breeding. However, even taking recent improvements in the provision of space, health care and mental stimulation into account, just about all zoos remain unable to address elephants’ essential needs in captivity. But, a vision of elephants in the future being held in vast sanctuary-type zoos that approximate their habitat in the wild may be somewhat ambitious. Keeping elephants is an expensive business, and zoos rely heavily on visitor numbers for revenue; this typically means being situated close to large population centres where real estate commands prime prices.

This book should be read and re-read by all who are involved in elephant management or have an interest in the welfare of these magnificent creatures.

Forthman, D.L. *et al.* (eds) (2009) *An elephant in the room: The science and well-being of elephants in captivity*. Center for Animals and Public Policy, Cummings School of Veterinary Medicine, Tufts University, North Grafton, MA, USA.

# companion animals

## The ideal Australian companion dog

Dogs, the most popular pet animal in the western world, provide their owners with many benefits apart from companionship: people who live with dogs are at lower risk of cardiovascular disease, depression and stress, and dogs facilitate social contact. Unfortunately, dog ownership is on the decline in Australia, probably due to lifestyle-associated factors, such as high-density urban living and longer working hours. Since the various breeds of dog in existence today are typically no longer used for their originally intended purposes (such as guarding, pulling goods, herding livestock, hunting and retrieving), the authors of this paper carried out a survey of the Australian public to determine the characteristics of the ideal Australian companion dog, with the view of eventually boosting dog ownership through the breeding of dogs that possess those characteristics.

The survey results revealed that the ideal dog in Australia is de-sexed, has short/straight hair, is of medium size (10-20 kg), is acquired as a puppy, and requires between 16 and 30 min exercise per day and between 1 and 15 min grooming per week. The 'ideal dog' is also safe with children, housetrained, healthy, comes when called, does not escape the property, is not destructive when left alone, lives until at least 10 years old, and is obedient, friendly and affectionate. An important finding from this study was that there was a strong desire amongst participants to acquire an ideal dog as a puppy. Characteristics considered unimportant by many of the participants included sex, colour, breed and cost to maintain.

King, T. *et al.* (In Press). Describing the ideal Australian companion dog, *Applied Animal Behaviour Science*.

# farm animals

## The production of foie gras

Foie gras, or 'fat liver', has long been considered a delicacy in some parts of the world, but its mode of production remains a matter of controversy. To produce foie gras, geese or ducks are typically force-fed for up to three weeks, at the end of which their livers will have enlarged to six to ten times their normal size.

The force-feeding procedure involves pushing a feeding pipe into the bird's crop, in order to deliver an abnormally large (up to five times normal) amount of feed, consisting of mashed maize and fat. This procedure can lead to a range of negative welfare outcomes for the birds, such as stress and discomfort, physical injury to the birds' internal organs, overheating due to the large intake of calories, and also death. In fact, mortality rates among force-fed birds can be up to 20 times as high as that of normally-fed birds. Force-fed birds also tend to avoid feeding areas and handlers, which indicates that they find the force-feeding procedure to be unpleasant. Moreover, foie gras birds are often housed in small, barren cages, in conditions that restrict their freedom of movement, and prevent them from carrying out even basic behaviours such as turning around and wing-flapping.

The author therefore recommends that current foie gras production methods be discontinued, unless drastic changes are made to the feeding, handling and housing regimes used in the industry.

Duncan, I. (2009) The scientific case against foie gras. BC SPCA, Vancouver, Canada.

## An automated welfare monitoring system for chickens

Although the welfare status of farm animals can be accurately gauged using scientific techniques, these procedures (such as measuring blood corticosteroid levels) are often unsuitable for use on a daily basis, and on a commercial scale. The authors of this study therefore trialled an objective, automated system of welfare monitoring on 10 intensively housed commercial broiler flocks in the United Kingdom. The new system involved making video recordings of the broiler flocks using webcams connected to laptop computers. The videos were then subjected to a computer-based statistical analysis of 'optic flow', which is a measure of the amount of movement occurring in a visual scene. The more traditional technique of

'gait scoring' was also carried out to verify the computer-generated results; here, a human observer was required to judge whether the birds were walking in a normal fashion, using a three-point scale.

The researchers found that the results of the automated technique matched the gait scores to a high degree, implying that it could be useful in accurately determining at least some aspects of welfare in broiler chickens. The advantage of the automated method is that it allows data to be collected continuously, and with minimal human involvement. It also means that specialists who routinely carry out traditional gait scoring procedures will not have to travel between farms, thereby minimising the potential biosecurity risk.

Dawkins, M. *et al.* (2009) Optical flow patterns in broiler chickens as automated measures of behaviour and gait, *Applied Animal Behaviour Science*, 119: 203-209.

## The use of an insecticide on unmulesed sheep

Blowfly strike is a major health problem faced by sheep farmers, but the most common method of treatment, mulesing, is associated with serious welfare concerns. The authors of this study therefore trialled the use of the insecticide dicyclanil (or Klik) on unmulesed sheep under grazing conditions in Longreach, Queensland. Sheep in different groups were treated with dicyclanil immediately, or six weeks after, crutching (the removal of wool from around the tail and rear legs of a sheep) or shearing. Blowfly larvae were also deliberately applied to the breeches of selected sheep, to simulate flystrike conditions.

The researchers found that while the sheep treated immediately after crutching were protected from flystrike for up to four months, the later treatment (six weeks after crutching) was effective in significantly reducing flystrike for up to six months. The concentration of insecticide was significantly higher on the wool of sheep treated six weeks after crutching, as compared to those treated immediately after crutching. There have, so far, been no reports of blowfly resistance to dicyclanil, and the authors suggest that a single well-timed application of this insecticide, along with a carefully managed crutching and shearing protocol, should adequately protect unmulesed sheep during high-risk periods. However, this is only a temporary solution, and long-term alternatives to mulesing are absolutely essential.

James, P. *et al.* (2009) Strategic use of crutching and dicyclanil to protect unmulesed sheep against breech strike, *Australian Veterinary Journal*, 87: 138-141.

## Physiological expression of emotional reactions in sheep

Animal welfare studies often require the identification of objective parameters, which allow the reliable and accurate identification of the animal's emotional state. In this study, the emotional states of sheep were investigated, by presenting them with positive, neutral and negative stimuli, while simultaneously monitoring key physiological variables, such as heart rate, breathing rate, body surface temperature and the sweating response.

Specifically, sheep were trained to associate a green light with an imminent delivery of food (the 'anticipation' stage). Six minutes after the green light was turned on, three types of food were presented to three different groups of sheep: inedible wooden pellets (negative), standard feed (neutral) and enriched feed (positive). The researchers found that the sheep regarded the neutral and positive feeds as equivalent: heart rate, respiration rate and variability of sweating were high for wooden pellets, and low for the standard and enriched feeds. Nevertheless, the physiological reaction for the two kinds of edible feed could be termed 'positive' overall, which was significantly different from the reaction for the wooden pellets. The authors suggest that a combination of heart rate, respiratory rate and sweating could be useful in assessing negative and positive emotional reactions in sheep.

Reefmann, N. *et al.* (In Press) Physiological expression of emotional reactions in sheep, *Physiology and Behavior*.

## Broiler chickens and light intensity

In the United States at least, broiler chickens are raised under near-constant low light conditions, as this is thought to result in higher body weight, improved feed conversion ratios and increased growth rate, due to an overall reduction in activity. This study evaluated the effects of three lighting conditions characterised by the difference between their 'day' and 'night' phases: the 'high contrast', 'medium

contrast' and 'low contrast' treatments. The behaviour of the birds was video recorded for 48 continuous hours per week during weeks 3-5 of age, and later analysed.

The researchers found that for birds reared in the 'low contrast' condition (i.e. when they were exposed to low light levels throughout the day), resting and foraging behaviours were more evenly distributed throughout the 24-hour period. Birds reared in the 'medium' and 'high' contrast conditions, however, preferred to forage more during the day phase of the 24-hour cycle, and rest more during the night phase. 'High contrast' birds also spent more time preening than birds in the other treatments. According to the authors, these results have significant welfare implications for broiler chickens: 1) the birds in the 'high contrast' treatment had more synchronised sleep-wake cycles, and were more likely to enjoy longer periods of disturbance-free sleep; 2) the increased preening may lead to better plumage condition in the 'high contrast' birds; and 3) higher light levels may actually be essential for the normal development of the eye.

Alvino, G. *et al.* (2009) Behavioural time budgets of broiler chickens reared in varying light intensities, *Applied Animal Behaviour Science*, **118**: 54-61.

## Virtual fences for cattle

Fences are an important part of the cattle industry, and can require significant levels of manpower and money to install. While electric fences are extremely successful at containing cattle in desired locations, they are not structures that can be moved around easily and regularly to facilitate activities such as strip grazing. The authors of this paper investigated a technique of training cattle to stay in one place by using a mixture of audio cues and mild electric shocks.

First, the researchers showed that cattle could indeed be trained to stop walking towards, or turn away from, a feeding trough on hearing an audio tone, followed by an electric shock. Very quickly, the cattle learned to associate the tone with a shock, and stopped or turned back simply on hearing it. The researchers next put the concept of 'virtual fences' to the test - the same procedure was applied to prevent cattle from wandering into an unmarked exclusion zone, in the absence of any visual signs. Once again, over a period of two weeks, the cattle learned to respond to the audio tone, and avoid walking into unmarked exclusion zones. The authors conclude that their study has implications for the development of welfare-friendly virtual fencing systems, as prior training with an audio cue should reduce the number of shocks that cattle will receive later in life.

Lee, C. *et al.* (2009) Associative learning by cattle to enable effective and ethical virtual fences, *Applied Animal Behaviour Science*, **119**: 15-22.

# animals used for sport, entertainment, recreation and work

## Pain in goldfish

The ability of fish to feel pain remains a controversial issue, one which has grave implications for commercial and sport fishing alike. Recently, some studies have demonstrated that at least some fish species possess pain-sensing nerve endings, and that individual fish will display escape behaviour when subjected to a painful stimulus.

The authors of this paper subjected goldfish to localised heating, to determine if this species finds high temperatures (up to 50 °C) painful. Morphine was also injected into some individuals, to see if this anaesthetic could counteract the effect of the heat treatment. The researchers found that the goldfish did show escape responses when the heat was turned on (at around 38 °C), indicating that they perceived the stimulus to be painful. However, the morphine had no effect on fish behaviour, at the concentrations used in the study. On the other hand, the morphine was able to reduce certain stress-related behaviours approximately two hours after the experiment, when the fish had been returned to their home tank.

Nordgreen, J. *et al.* (2009) Thermonociception in fish: Effects of two different doses of morphine on thermal threshold and post-test behaviour in goldfish (*Carassius auratus*), *Applied Animal Behaviour Science*, **119**: 101-107.

## Working dogs in kennels

Research has shown that working dogs experience high levels of stress when placed in a kennel, especially if they have no prior experience of such a facility. This paper reviews the available research on the welfare of dogs, from the points of view of detecting the signs of suffering in dogs, as well as improving the welfare of dogs.

Dogs will often display a range of specific behaviours when their welfare is jeopardised. These include sudden changes in behaviour (such as fearfulness, aggression, or inactivity), self-mutilation or over-grooming, performance of stereotypies such as tail chasing, shivering or cold body temperature, non-temperature-related trembling or body shaking, paw-lifting while sitting or standing, weight loss, loose faeces, eating faeces, sore feet, excessive barking, whining or howling, and chewing parts of the kennel. Stressful situations can be avoided by introducing dogs to the kennel environment gradually, providing increased contact with handlers and caretakers, avoiding leaving dogs alone for long periods, making the dog's routine more predictable, housing dogs in pairs, providing time for free-running in open areas, preferably in pairs, making the kennel environment more comfortable and interesting, using positive reinforcement instead of punishment, introducing diet changes gradually, and building a positive relationship with the dog.

Rooney, N. *et al.* (2009) A practitioner's guide to working dog welfare, *Journal of Veterinary Behavior*, 4: 127-134.

## research animals

### Rats in enriched environments

Many recent studies have shown that rats reared in so-called 'enriched environments', perform better in challenging cognitive tasks than rats kept in barren cages. It is generally believed that the opportunity to interact with socially and physically complex surroundings somehow increases the 'brain power' of rats from enriched cages, thereby making them better learners of new tasks. The authors of this paper tested an alternative hypothesis, namely that rats from enriched cages are better able to deal with novel situations, simply because they have lower anxiety levels.

The researchers used a Morris Water Maze to investigate this idea: rats were released one at a time into a circular tub of water, and had to swim around until they found a hidden platform. They were repeatedly tested in this way, in order to determine how quickly they could form a memory of the platform's position. The authors found that rats from enriched cages (furnished with tissue-paper nesting material, and assorted objects such as tunnels, swings, wooden blocks, etc.) took less time to find the platform than rats from barren cages. However, further analysis of the video recordings showed that the rats from barren cages spent more time swimming close to the wall of the tank, instead of actively looking for the platform; this is a typical sign of anxiety in rats exposed to a novel situation. In a second experiment, the barren cage rats also took longer to leave a dark box, and explore a well-lit open area than the enriched-cage rats - this was another clear sign of anxiety. The authors concluded that environmental enrichment, instead of improving the cognitive abilities of rats, simply makes them less anxious, and thereby perform better in learning tasks.

Harris, A. *et al.* (2009) Environmental enrichment enhances spatial cognition in rats by reducing thigmotaxis (wall hugging) during testing, *Animal Behaviour*, 77: 1459-1464.

### Anaesthetising rats

Although carbon dioxide is commonly used as a 'humane' agent for euthanasing laboratory rats, many studies have shown that this gas is actually quite aversive to rats. In other words, rats exposed to high carbon dioxide levels will try to escape an enclosure containing this gas well before they lose consciousness, and also display gasping and rapid body movements, indicating a state of distress. In this study, two alternative anaesthetic gases, halothane and isoflurane, were trialled on rats, in order to investigate whether the animals found them aversive.

In the first experiment, the researchers tested whether the gradual release of anaesthetic into a chamber, where the rats were feeding on a sweet food, would make the animals stop feeding and leave. This was

indeed the case - on their first (and subsequent) exposure to the gas, most of the animals exited the chamber within roughly a minute, leaving most of the food uneaten. In the second experiment, the rats were allowed to choose whether to enter the chamber with anaesthetic, and were also allowed to leave whenever they wished. Some of the rats did not enter the chamber at all, but those that did, left when they started to lose their coordination. Eventually, however, all rats returned to the feeding chamber with gas in it. The authors concluded that rats may only find the gases halothane and isoflurane to be temporarily aversive, and that they may be a more humane method than carbon dioxide for inducing unconsciousness prior to euthanasia.

Makowska, I.J. & Weary, D. (2009) Rat aversion to induction with inhalant anaesthetics, *Applied Animal Behaviour Science*, **119**: 229-235.

## Hair loss in captive macaques

Hair and feather loss is far more common among captive animals than in their wild counterparts, and may occur due to a range of social, environmental, behavioural and physiological reasons. In captive rhesus macaques, for example, animals that are held in crowded, high-conflict conditions, or are not given the opportunity to forage normally, might resort to over-grooming, in order to cope with the stress.

In this study, over 400 captive female rhesus macaques at the California National Primate Research Centre were observed over a 14-month period, in order to identify the causes of increased hair loss. The researchers found that pregnant females, low-ranking females, older females and females in larger groups were more likely to have higher levels of hair loss. In addition, enclosures with gravel substrates (instead of grass) and the time of year also affected the rate of hair loss (hair loss was lowest in autumn). The authors concluded that hair loss can be greatly reduced by making simple changes in housing conditions, such as planting grass in enclosures, and reducing densities to levels comparable to those of wild groups of rhesus macaques.

Beisner, B. & Isbell, L. (2009) Factors influencing hair loss among female captive rhesus macaques (*Macaca mulatta*), *Applied Animal Behaviour Science*, **119**: 91-100.

## other articles and publications of interest

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Ahmadzadeh, A., Frago, F., Shafii, B., Dalton, J.C., Price, W.J. & McGuire, M.A. (2009) Effect of clinical mastitis and other diseases on reproductive performance of Holstein cows, *Animal Reproduction Science*, **112**(3-4): 273-282.

Alali, W.Q., Scott, H.M., Christian, K.L., Fajt, V.R., Harvey, R.B. & Lawhorn, D.B. (In Press) Relationship between level of antibiotic use and resistance among *Escherichia coli* isolates from integrated multi-site cohorts of humans and swine, *Preventive Veterinary Medicine*.

Amat, M., Manteca, X., Mariotti, V.M., Ruiz de la Torre, J.L. & Fatjo, J. (2009) Aggressive behavior in the English cocker spaniel, *Journal of Veterinary Behavior: Clinical Applications and Research*, **4**(3): 111-117.

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Bonneau, M. & Lebret, B. (In Press) Production systems and influence on eating quality of pork, *Meat Science*.

Breen, J.E., Green, M.J. & Bradley, A.J. (2009) Quarter and cow risk factors associated with the

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## upcoming events

### 43rd Congress of the International Society for Applied Ethology (ISAE) 6-10 July 2009

There will be plenary sessions, short oral and poster presentations on the sub-themes:

- Welfare assessment and enhancement
- Management of unwanted animals
- Animal emotion and cognition
- Animals in extensive and natural environments
- Animal-human interactions

Visit <http://www.isae2009.com> for more information.

### International Society for Equitation Science Annual Conference 12-14 July 2009

The conference theme of *Ethical Equitation - a sustainable approach* will be directly applicable to coaches and judges of horse sport as it considers how horse sport and horse welfare can go hand in hand.

Days 1 and 3 will focus on reporting findings of new research relevant to sport horses including:

- What is the effect of different training regimes on the physical fitness of the equine athlete?
- Can the presence of a human help to calm a nervous horse?
- How does rider position affect stride length during canter?
- How is the temperament of a future sport horse accurately assessed?
- Is horse misbehaviour a major cause of poor performance?
- What equipment and training increases the risk of behaviour problems in the ridden horse?

Three exciting keynote speakers have agreed to present their thoughts on elite competition, untapped aspects of psychology in equestrianism and ethical equitation.

A highlight of the three-day conference will be the Day 2 practical demonstrations from some of Australia's leading horse professionals.

Visit <http://www.equitationsscience.com/Sydney2009.html> for more information.

## Minding Animals 13 - 18 July 2009

The conference has six major themes and objectives:

- To reassess the relationship between the animal and environmental movements in light of climate change and other jointly-held threats and concerns
- To examine how humans identify and represent nonhuman animals in art, literature, music, science, and in the media and on film
- How, throughout history, the objectification of nonhuman animals and nature in science and society, religion and philosophy, has led to the abuse of nonhuman animals and how this has since been interpreted and evaluated
- To examine how the lives of humans and companion and domesticated nonhuman animals are intertwined, and how science, human and veterinary medicine utilise these important connections
- How the study of animals and society can better inform both the scientific study of animals and community activism and advocacy
- How science and community activism and advocacy can inform the study of nonhuman animals and society

Visit <http://www.mindinganimals.com> for more information.

To be added to our subscription list email: [science@rspca.org.au](mailto:science@rspca.org.au)