



THE ANIMAL WELFARE SCIENCE CENTRE ANNUAL REPORT

2007-2008

FOREWORD

The Animal Welfare Science Centre was established in 1997 by the University of Melbourne as a collaborative centre for research, teaching and training in animal welfare, with Monash University and the Department of Primary Industries (Victoria).

The Centre's research and teaching capacity is considerable, with scientific expertise and experience in the key disciplines of animal behaviour, psychology, stress physiology and veterinary medicine. There are currently 13 scientists, 13 post-graduate students and 13 support staff operating within the Centre across the partner organisations.

There are also substantial specialised research and teaching facilities associated with the three partner organisations that are utilised by the scientific personnel working within the Centre. These facilities include research and housing facilities for farm, companion and laboratory animals, endocrine laboratories, multimedia publication laboratories and classroom and seminar facilities for teaching and training.

The Centre also has a formal collaborative agreement with the Department of Animal Science at The Ohio State University (OSU). As part of this agreement, the Centre provides and delivers animal welfare teaching modules into course curricula at OSU, assists in the establishment and delivery of training programs on animal handling and welfare for the livestock industries in the US and partners OSU in collaborative animal welfare research.

The Centre was established to provide a focus and direction for the partner organisations' academic and research resources in animal welfare.

The specific aims of the Centre are as follows:

To conduct:

- Strategic animal welfare research to resolve major animal welfare issues and student training
- Targeted industry, public and tertiary education designed to improve animal welfare and productivity and to assure local and international consumers, the public and Governments that the welfare standards for Australian animals are underpinned by sound and well-accepted science.

In order to achieve these aims, the Centre conducts research and education in 4 program areas:

1. Welfare methodology
2. Housing and Husbandry effects on animal welfare
3. Attitudes to animals and animal welfare, and farmer, consumer and community behaviour
4. Tertiary and post-graduate education and training

These programs are followed to achieve the Centre's targeted outputs:

- Develop scientifically defensible welfare methodology.
- Use scientifically defensible methodology to establish, amend or validate animal welfare standards and practices.
- Develop and support industry education and training strategies and provide scientific advice to support the modification of codes of practice and the development of quality assurance programs to introduce scientifically defensible welfare standards in the animal industries.
- Understand public and consumer attitudes to animal welfare to assist Governments and industry in
 - developing animal welfare policy
 - assuring local and international consumers, public and other governments of the sound welfare standards for Australian domestic animals.
- Ensure tertiary students entering the animal industries are better prepared to provide sound, science-based advice on animal welfare practices to industry, interest groups and the public.
- Provide high quality postgraduate and postdoctoral training for the next generation of researchers and teachers in animal welfare science.

Our Vision

“Animal welfare and its constant improvement are societal and cultural norms”

Our Mission

“To contribute to improved animal welfare as a world leading provider of expert information, advice and education underpinned by rigorous research”

Chairman's Report

The Centre continues to thrive under the outstanding leadership of its Director Paul Hemsworth and Executive Officer Jeremy Skuse. A major role of the Centre is post Graduate training in animal welfare science and there are currently 10 PhD students, 3 students studying at a Master's level and 6 undergraduate students.

There have been major changes to the membership of the Board of Management of the Centre. Geoff Kroker (DPI), Grahame Coleman (Monash University) and Snow Barlow (University of Melbourne) have all retired from the Board. All of these were foundation members of the Board and have made an invaluable contribution to its establishment and ongoing success for which I heartily thank them. Grahame will continue to have significant input into the Centre through his active involvement in, and leadership of, many of our current and planned research projects. The Department of Primary Industries' representative is now Dr Ron Prestidge, Executive Director of Future Farming Systems Research. Monash University is represented by Professor Iain Clarke, Head of the Department of Physiology, and the University of Melbourne by Professor Rick Roush, Dean of the Melbourne School of Land and Environment. Welcome to Ron, Iain and Rick – their expertise in their own research fields and skills in Senior Research Management will be of great benefit to the Board.

Dr Greg Cronin has been a valued member of the AWSC research team and has recently left the Department of Primary Industries to take up a position at the University of Sydney. Greg has been involved in animal behaviour and welfare research at the DPI for over 25 years. Two developments from his basic research in the area of porcine maternal behaviour have been the Werribee Farrowing Pen and a computerised audio system for stimulating nursing behaviour in sows and litters leading to increased piglet growth. Greg's enthusiasm and scientific rigour will be missed by members of the Centre but he will be continuing research in the area of animal welfare and the Centre looks forward to continuing close collaboration.

Dr John Barnett has also moved on from DPI, but will still remain within the Centre as he has taken up a research position at The University of Melbourne.

The Board is grateful for the ongoing input of the Advisory Committee and its Chairman Peter Penson to the success of the Centre. We welcome new members David Marland from DPI (replacing Michelle Jones-Lennon) and Nick Renyard from United Dairyfarmers of Victoria. Thank you to Michelle Jones-Lennon from DPI for her commitment to the Centre through her membership of the Advisory Committee.

The Centre has continued to play a significant ongoing role in the implementation of the Australian Animal Welfare Strategy through membership of various Working Groups. It is hoped that one important outcome will be a better funded and a more coordinated national approach to animal welfare research and the setting of national research priorities.

The AWSC will be commissioning a full scientific and operational review of the Centre in 2009 to ensure that the Centre maintains its relevance and builds on its capability into the future.

Professor Mike Rickard

Chair

Board of Management

Animal Welfare Science Centre

Director's Report

The Centre has continued to contribute both nationally and internationally to animal welfare research, teaching and training and I would like to briefly highlight some of these achievements.

Confinement of farm animals remains the most controversial welfare issue and research is necessary to understand the effects of design features, such as space, social and human contact and environmental enrichment, on the welfare of farm animals, particularly as alternatives or modifications are required to current confinement systems. The Centre, with its capacity and collaborations, has commenced a large project examining social and spatial effects on aggression and stress in sows housed in groups during gestation. The Centre is also in discussion with the poultry industry on similar research in laying hens in conventional and alternative housing systems. Seven full journal publications and four conference publications over the last 12 months reflect the Centre's contribution to addressing these contentious welfare issues associated with confinement of farm animals.

The Centre is an international leader in its research on understanding and improving human-animal interactions in animal agriculture, a topic that has substantial implications for both animal welfare and productivity. The Centre is a major partner in a collaborative European project which is part of the European Union's 6th Framework Welfare Quality program. This project, which utilises previous and current research by the Centre, is developing integrated, knowledge-based, practicable species-specific training strategies for stockpeople with the specific aim of improving farm animal welfare. Current research projects on human-animal interactions in the egg industry and in the red meat industry are progressing well with the likely outcome of training packages for stockpeople working with laying hens and sheep and cattle pre-slaughter. The research on human-animal interactions in the egg industry has an international focus with a component of the research conducted in the USA. Training of stockpeople and animal carers can improve the welfare of animals during all routine housing and management practices. The Centre will continue its research on post-farm gate animal handling, review the need for research in the extensive livestock industries and roll-out existing and new handling training packages to industry. Over the last 12 months, Centre scientists have published one chapter and four conference publications on this topic of human-animal interactions in animal agriculture.

The Centre continues to plan, develop and expand its companion animal research. While companion animal welfare is an important topic for the general community and animal owners, funding for research in this area is limited. Nevertheless, the Centre has five projects currently underway on companion animals involving six PhD and three Honours students. This research is examining aspects of human-dog and human-cat relationships such as selection and training of shelter workers, assessing suitability of dogs in shelters, handling of cats at shelters, matching shelter dogs with owners, assessment of dog personality and behaviour, the relationships between owner attitudes and behaviour and dog obesity, and interactions between dog and owner characteristics and owner satisfaction and commitment. Furthermore dog and cat research is also being conducted on the effects of kennel enrichment, increased social contact and hides for cats. Funding from the Bureau of Animal Welfare, Petcare Information and Advisory Service and the RSPCA and in-kind support from Guide Dogs Victoria and welfare organizations such as the RSPCA, Animal Aid Trust, the Lost Dogs Home and the Cat Protection Society are critical in undertaking this research. The publication of seven full journal publications and five conference publications on companion animals demonstrate the Centre's developing scientific capability in this very important area. There is no doubt that there is growing community and government interest in

the welfare of companion animals and this developing scientific capability of the Centre positions the Centre in an ideal position to understand and provide the community and government with solutions to these important domestic animal welfare issues in the community. This important addition to the Centre's traditional capability provides the partner organisations with a research capability that is internationally at the forefront of research and training in this critical welfare topic of human-animal interactions.

In an ethical analysis of an animal use, science can provide the factual basis of the impact of a husbandry or housing practice on the biology of the animal however, there is considerable uncertainty within science on the concept of animal welfare. Scientists differ in their views on how animal welfare should be measured or judged, with three prominent concepts of animal welfare in the literature: the welfare of animals is judged on the basis of:

1. How well the animal is performing from a biological functioning perspective;
2. Affective states, such as suffering, pain and other feelings or emotions; and
3. The expression of normal or 'natural' behaviours.

These different concepts or views on animal welfare can lead scientists to use different criteria or methodologies in assessing an animal's welfare. With initial and substantial funding from the Victorian government and more recent funding from the livestock industries, such as the Poultry CRC and the Australian Pork Limited, the Centre has invested heavily in fundamental research aimed at refining the scientific concept of animal welfare and in turn the corresponding welfare methodology. The Centre is examining the relationships between various approaches to welfare assessment, particularly two common approaches involving biological functioning and animal preferences. Without an agreed methodology, progress in welfare research, development of implementation of welfare standards and development of welfare assessment tools will continue to be both arguable and lacking in a broad consensus. Four full journal publications and 11 conference publications highlight the Centre's contribution to this very important topic in animal welfare science.

Centre scientists have also been active in education and training activities. Postgraduate programs, with both local and international students, are a significant and critical part of the Centre's successful research programs. The staff of the Centre also teach several subjects related to animal welfare to animal science students at the University of Melbourne and Centre staff in the three partner organizations deliver the course 'Animals in Society' at The Ohio State University.

The Animal Welfare Science Centre, a joint centre of the University of Melbourne, Monash University and the Department of Primary Industries (Victoria), was established in 1997 to provide Victoria and Australia with a world class centre of excellence in animal welfare research, education and training. After a decade of development, I believe that the Centre is fulfilling this role. With its current scientific capability of both staff and students, together with the support of the Centre's Board and Advisory Committee as well as the relationships that the Centre has developed with numerous stakeholder groups, the Centre is well equipped and placed to influence animal welfare training, education and policy, both nationally and internationally. I look forward with enthusiasm to the next exciting decade of the Animal Welfare Centre.

Professor Paul Hemsworth

Director

Animal Welfare Science Centre

CENTRE PERSONNEL

Board of Management

Professor Mike Rickard, Chair

Dr. Ron Prestidge, Department of Primary Industries, Victoria

Professor Rick Roush, The University of Melbourne

Professor Iain Clarke, Monash University

Professor Paul Hemsworth, The University of Melbourne

Scientists

Professor Paul Hemsworth (The University of Melbourne, Parkville and DPI Werribee) – Director of the Centre: A research career studying the behaviour and welfare of farm and companion animals, particularly examining the influence of the social and physical environment on farm animal behaviour and welfare and the influence of human-animal interactions on animal welfare and productivity.

Professor Grahame Coleman (Head of the School of Psychology, Psychiatry and Psychological Medicine, Monash University, Caulfield and Clayton) – Deputy Director of the Centre: Grahame has followed a research career in aspects of human and animal behaviour associated with biological rhythmicity and sleep and changes in stress-related and reproductive hormones. Current research interests focus primarily on human-animal interactions in farm and companion animals and public attitudes to animal welfare.

Associate Professor John Barnett (The University of Melbourne, Parkville) – A research career in endocrinology, particularly stress physiology and its application to the welfare of farm animals. A focus has been on housing systems and their design on animal welfare.

Associate Professor Alan Tilbrook (Physiology, Monash University, Clayton) – A research career in endocrinology and behaviour of domestic animals. Particular interests include the endocrine and neuroendocrine control of reproduction in males, the effects of stress on reproduction and endocrine and behavioural responses to stress.

Dr. Pauleen Bennett (Psychology, Monash University, Caulfield) – Research career studying behavioural neuroscience related to animal learning and memory formation. Recent research interest in human-animal interactions, particularly with respect to companion animal species.

Dr. Greg Cronin (DPI, Werribee) - A research career studying the behaviour and productivity of pigs and in particular the effects of the environment on maternal behaviour and the role of maternal behaviour in piglet survival and growth. Interest also in alternative housing systems for sows during gestation and farrowing/lactation and housing systems for poultry. Greg left the Centre in June 2008 to take up a position at the University of Sydney.

Dr. Ellen Jongman (DPI, Werribee) - Research interests include the effect of housing, husbandry procedures and management on the welfare of sheep and dairy cows

Dr. Samia Toukhsati (Psychology, Monash University, Caulfield) – Research interests include animal cognition and welfare, and her recent research has included understanding human-animal interactions, particularly with regard to companion animal owner attitudes and behaviours.

Dr. Mariko Lauber (DPI, Attwood) – Research interests include behavioural development in dairy calves and its implication in assessing animal welfare implications of new practices and technologies. Current activities focusing on industry, public and tertiary training in animal welfare.

Dr. Brian Leury (The University of Melbourne, Parkville) – Research interests include animal nutrition and physiology.

Dr Linda Marston (Psychology, Monash University, Caulfield) - Research interests include human-animal interactions, particularly with respect to companion animal species.

Dr. Sarah Chaplin (The University of Melbourne, Dookie) - Research interests in the effects of management practices on dairy cow behaviour and welfare.

Dr. Sue Hides (DPI, Maffra) – District Veterinary Officer with long standing interests in the welfare of dairy cattle. Specific areas of interest include management and transport of young calves and the use of analgesics and anaesthetics to provide pain relief for cattle undergoing husbandry procedures.

Administration

Mr. Jeremy Skuse (BAgSc hons) – Executive Officer of the Centre, significant professional livestock experience derived from operating in senior management, quality assurance and extension roles in Australia, Asia and the United States.

Current Postgraduate students

Lauren Edwards (PhD, Melbourne)

Marcus Karlen (PhD, Melbourne)

Sonja Laine (PhD, Melbourne)

Cameron Ralph (PhD, Melbourne)

Bronwyn Stevens (PhD, Melbourne)

Lauren Hemsworth (PhD, Monash)

Jacqui Ley (PhD, Monash)

Kate Mornement (PhD, Monash)

Vanessa Rohlf (PhD, Monash)

Jordan Schaan (PhD, Monash)

Mia Cobb (Masters, Monash)

Joanna Engel (Masters, The Ohio State University)

Ken Smith (Masters, The Ohio State University)

Technical Staff

Melanie Conley (Melbourne)

Melanie Monk (Melbourne)

Judy Nash (Melbourne)

Maxine Rice (Melbourne)

Melanie Webber (Melbourne)

Danielle Bullen (Monash)

Carter Lui (Monash)

Alanna Sawyer (Monash)

Samantha Borg (DPI)

Tracie McCallum (DPI)

Lisa Newman (DPI)

Bruce Schirmer (DPI)

International Associates

Dr Jim Kinder, The Ohio State University

Dr Naomi Botheras, The Ohio State University

Dr Maurice Eastridge, The Ohio State University

Dr Mike Lilburn, The Ohio State University

Dr Linda Lobao, The Ohio State University

Dr Steve Moeller, The Ohio State University

Professor David Mellor, Massey University, NZ

Dr Adele Arnold, AgResearch NZ

Advisory Committee

Dr. Peter Penson, Chair, Animal welfare consultant

Dr. Onn Ben-David, Vice- President, RSPCA, Vic

Mr. Alan Bowman, Victorian Farmers Federation

Ms. Michelle Edge, Symbio Alliance

Dr. Robert Holmes, Animal Behaviour Clinics

Mr. David Marland, DPI

Mr. Noel Maughan, MLA (Ret)

Professor David Mellor, Animal Welfare Science and Bioethics Centre, Massey University

Dr. Denise Noonan, Univ. Adelaide

Ms. Glenys Oogjes, Director, Animals Australia

Professor Clive Phillips, Centre for Animal Welfare and Ethics, University of Queensland

Mr. Nick Renyard, United Dairyfarmers of Victoria

Mr. Kenton Shaw, QAF Meat Industries

Dr. Stephen Tate, Bureau of Animal Welfare

FUNDING FOR MAJOR CENTRE RD&E PROJECTS 2007/2008

Major Research Projects (source, title, principle investigators, and amount)

Program 1 Welfare methodology

Beef Cooperative Research Centre (Beef CRC)

Fear / Stress model for beef cattle

Barnett and Hemsworth

\$ 118,288

Australian Pork Limited (APL)

Welfare methodology – relationships between biological functional and preference methodologies in studying animal welfare, pigs

Hemsworth, Barnett

\$ 82,500

Poultry Cooperative Research Centre (Poultry CRC)

Welfare methodology – relationships between biological functional and preference methodologies in studying animal welfare, poultry

Hemsworth, Barnett

\$ 82,335

Program 2 Housing and husbandry effects on animal welfare

Australian Pork Limited (APL)

The effects of group housing during gestation on sow welfare and reproduction

Hemsworth, Tilbrook, Karlen

\$ 246,000

Australian Egg Corporation Ltd (AECL)

Importance of nests for the welfare of laying hens

Cronin, Barnett

\$ 109,000

Department of Primary Industries, Victoria (DPI)

Evaluation of welfare issues associated with extended lactation in dairy cows

Jongman

\$ 64,000

Behavioural responses of dairy cows to mastitis: Indicators of pain and welfare and productivity implications

Botheras

\$ 15,000

Strategic labour saving and productivity technologies for livestock industries

Cronin

\$ 80,000

Benchmarking welfare indicators for the dairy and lamb industries

Jongman

\$ 120,000

Poultry Cooperative Research Centre (Poultry CRC)

Using machine vision to count hens and reduce egg breakage – “proof of concept”

Cronin

\$ 18,000

Ohio Agricultural Research and Development Centre (OARDC)

Behavioural responses of dairy cows to mastitis: Indicators of pain and welfare and productivity implications

Botheras, Hemsworth

\$ 53,400 approx (USD 47,020)

Department of Primary Industries and Fisheries, Qld (DPIF)

A review and evaluation of strategies to manage unwanted cats and dogs in Queensland

Marston, Bennett, Rohlf, Mornement

\$ 65,000

Program 3 Attitudes to animals and animal welfare, and farmer, consumer and community behaviour

Australian Pork Limited (APL)

Revision of Pig ProHand

Coleman and Hemsworth

\$ 62,888

Field trial of pig stockperson selection

Coleman

\$ 6,924

Bureau of Animal Welfare (BAW)

The welfare of recreational horses in Victoria: the occurrence of and factors associated with horse welfare

Coleman, Jongman and Hemsworth

\$ 40,167

A summary of Australian research pertaining to cat ownership and overpopulation

Marston, Bennett

\$ 4,711

Characteristics of pets and owners who visit veterinarians

Marston, Bennett

\$ 45,878

Post-adoptive interviews conducted with people who have adopted cats from welfare shelters

Marston, Bennett

\$ 52,671

EU 6th Framework

"Minimising Handling Stress" - Prototype training packages for dairy, cattle, pigs and laying hen

Coleman, Hemsworth

\$ 36,739 approx (EUR 22,402)

Mintrac/Meat Livestock Australia (MLA)

ProHand for the livestock processing industry: a professional livestock handling package

Hemsworth and Coleman

\$ 72,728

Ohio Agricultural Research and Development Centre (OARDC)

Farm animal welfare in Ohio: Assessing public concern and implications for the food animal industry

G.Coleman, P.Hemsworth

\$ 49,590

Petcare Information and Advisory Services (PIAS)

Characteristics of successful human –dog relationships

Ley, Bennett

\$ 26,000

Poultry Cooperative Research Centre (Poultry CRC)

Human – animal relationships in the laying hen

Hemsworth, Coleman, Barnett

\$ 52,151

Program 4 Tertiary and post-graduate education and training

The Ohio State University (OSU)

Design and delivery of “Animals in Society” as part of the “Human and animal interactions” cluster at The Ohio State University

Bennett, Lauber, Toukhsati

\$ 50,989

Poultry Cooperative Research Centre (Poultry CRC)

Implementation of Animal Welfare Standards into the meat chicken industry’s company QA programs

Barnett, Edge

\$ 23,550

Total Funding (Major Projects) \$ 1,578,509

SUMMARY OF CENTRE RD&E PROJECTS

Program 1 Welfare methodology

Fear / Stress model for beef cattle

Barnett and Hemsworth

Beef CRC Funded

This project is to develop a fear model of chronic stress in cattle for use in subsequent experiments to develop tools for welfare assessment and thresholds, predominantly using gene expression methodologies to identify relevant biochemical pathways, both partially understood (e.g. HPA axis), and novel. The project is part of the CRC for Beef Genetic Technologies, under Program 3 of the CRC, 'Adaptation and Animal Welfare'.

Program 3 aims to develop and determine robust, scientifically defensible measures and critical thresholds that define the welfare status of cattle when exposed to conditions that elicit a sustained stress response; these thresholds (or lower levels) will be available for use by animal welfare policy makers, regulatory agencies and the beef industry by 2011.

Welfare methodology – relationships between biological functional and preference methodologies in studying animal welfare, pigs

Hemsworth, Barnett

APL Funded

This project addresses the key area of developing objective measures of animal welfare. There are, in general, two major approaches used by scientists to study animal welfare: functioning and preference approaches. The first is an integrated approach measuring behaviour, physiology and health and the consequent fitness responses to assess biological functioning on the basis that difficult or inadequate adaptation will generate welfare problems for animals. The second is the use of animal preference (and behavioural demand) testing on the basis that these preferences are either influenced by the animal's emotions, which have evolved to motivate behaviour in order to avoid harm and facilitate survival, growth and reproduction, or reflect important biological requirements of the animal. While generally considered separately, the functioning and preference approaches nevertheless show considerable convergence that is not widely recognised. For example, it is animals are likely to be motivated to choose those resources (or behaviours) that maintain homeostasis to optimise their fitness and maintain normal biological functioning.

The aim of this project is to compare these two main approaches to welfare assessment, the functioning approach and the preference approach. Such knowledge is essential to the development of a well-accepted methodology or methodologies to study animal welfare. The finding that the resources that are the most preferred by animals are the same resources that animals, when deprived of them, show the most extreme coping attempts (e.g. a chronic stress response), would indicate that both approaches are measuring the integrated physical,

physiological and psychological states of the animal. If this can be demonstrated it would assist in achieving a wider consensus on welfare assessment through progressing a single, and more encompassing, scientific concept of animal welfare.

Welfare methodology – relationships between biological functional and preference methodologies in studying animal welfare, poultry

Hemsworth, Barnett

Poultry CRC Funded

The specific objectives of this project are (1) to develop a suitable methodology for choice (or preference) testing to measure the animal's longer term choice for specific resources and then (2) compare the two main approaches to welfare assessment: "normal biological functioning" and "animals choices" approaches. This will enable us to study the relationship between these two approaches, that is whether or not the resources that are the most preferred by animals are the same resources that animals, when deprived of them, show the most extreme attempts to cope and adapt.

This research will thus provide an understanding of the relationship between fundamental biological requirements and preferences of animals with the opportunity to integrate these two approaches into a single animal welfare model that incorporates these two concepts of animal welfare. Such knowledge is essential in the development of a well-accepted methodology or methodologies. The finding that the resources that are the most preferred by animals are the same resources that animals, when deprived of them, show the most extreme attempts to cope and adapt, would indicate that both approaches are valuable and complementary in assessing welfare.

Program 2 Housing and husbandry effects on animal welfare

The effects of group housing during gestation on sow welfare and reproduction

Hemsworth, Tilbrook, Karlen

APL Funded

Recent changes in the Australian Model Code of Practice for the Welfare of Animals – Pigs, will restrict the duration of housing gestating sows in stalls to early gestation. As a result, the Australian pork industry is likely to consider several housing options. In addition to continuous group housing during gestation, there will be increasing interest in a combination of stall housing of sows for 6 weeks post-mating followed by group housing for the remainder of gestation.

This project will examine the effects of space allowance, group size, time of mixing and feeding system on aggression, stress, injury, lameness and reproduction in sows housed in groups during gestation.

The importance of nests for the welfare of laying hens

Cronin, Barnett

AECL Funded

The housing of laying hens in cages is a contentious welfare issue which has already impacted negatively on public sentiment and led to the introduction of regulations that modify both cage size and stocking density. Further additional and expensive regulations may be introduced in the future. One key criticism of cages for layer hens has been that hens become frustrated at the time of oviposition in the absence of a nest (box). Although nests are considered by some to be important for welfare, our research has shown that for commercial Hyline Brown hens experienced with nests, only about two-thirds of the hens chose to use the nest for egg laying.

Data from Europe also indicate that fewer brown birds lay in nests (in furnished cages) than white birds; these data have been largely ignored. This raises questions as to both the welfare implications of nests and the attributes of nests that birds consider attractive. A review by Ekstrand and Keeling (1994) provides evidence to support the inclusion of nest boxes in layer cages. Duncan (1992) considered the lack of a nest site in conventional cages was the biggest welfare problem in this system of housing.

The importance of the nest box is based on evidence of preference tests and evidence of frustration in the absence of a nest box (see review by Ekstrand and Keeling 1994) and the strong motivation of hens to use a nest (Smith *et al.*, 1990). The project is assessing the importance of nest boxes for the welfare of hens in modern cages, and determining the factors that influence use of the nest box by hens.

Evaluation of welfare issues associated with extended lactation in dairy cows

Jongman

DPI Funded

The objectives of this study are to examine the impact of extended lactation on animal welfare. While there are some possible positive effects, there may also be negative implications. Awareness of possible negative welfare impacts may assist in the management of herds with extended lactation. If extended lactation is found to have positive welfare consequences this may help to 'sell' this practice to farmers who are struggling to maintain spring calving. Practices with a negative welfare image such as the hormonal induction of calving may be unnecessary in most circumstances if farmers switch to a system with extended lactation, thus improving the welfare image of the whole dairy industry.

Periods when cows are most under metabolic pressure include end of lactation in the first milking cycle, around calving, during peak lactation and at the end of the second milking cycle, and at this time blood samples will be analysed for immunological parameters and milk samples will be analysed for cortisol. Cows will be assessed for lameness twice each year using a visual lameness scoring system. Additionally hoof condition will be assessed once a year, when cows are

considered most at risk of lameness, by a trained veterinarian. Any veterinary treatment during the duration of the study will also be recorded. Live weight, white cell count, milk production and milking order will be compared between EL and control cows. In addition electronic observations will be made on time budgets, in particular walking, resting time and grazing. In the third year cows will be weighed shortly before calving as well as after calving. Calves will be tested for early development and the development of EL and control calves will be compared. Cows will again be assessed for white cell count and lameness at this time.

Strategic labour saving and productivity technologies for livestock industries.

Cronin

DPI Funded

The Code of accepted farming practice for the welfare of sheep in Victoria requires owners and their advisers, including absentee owners and their advisers, to inspect sheep sufficiently often to maintain them in sound and healthy condition. The frequency and thoroughness of inspection should be related to the likelihood of risk to the welfare of the sheep in relation to food, water, protection against natural disasters and likelihood of diseases, e.g. flystrike. Sheep grazing under more extensive conditions require variable supervision according to the density of stocking, availability of suitable feed, reliability of water supply, age, pregnancy status, climatic conditions and management practices.

In the face of reduced skilled labour, increasing stock per unit of labour, remote properties and less family support, how will future sheep farmers in the Sheep-Wheat Zone in Victoria comply with the Code of accepted farming practice for the welfare of sheep?

This project scanned the potential for using remote sensing technology to reduce labour demands, increase labour efficiency and effectiveness for sheep farmers, and thus facilitate improved management of the entire sheep enterprise, and remote monitoring of sheep welfare. World-wide expansion in the development of remote sensing (or bio-logging) transponder devices to enable the measurement of many different variables is occurring rapidly. The livestock industries are currently interested in transponder technology to capture biometric information to facilitate the wireless monitoring of animal physiology states to assist in micro-managing the efficiency of animal production and the welfare of animals.

Benchmarking welfare indicators for the dairy and lamb industries

Jongman

DPI Funded

Animal welfare is an issue of increasing interest and concern to the broader community and both government and livestock industries are looking to better assess and monitor their performance in addressing animal welfare issues. The concept of benchmarking and compliance has the potential to assess industry performance in relation to animal welfare. It is important that animal industries can demonstrate compliance with welfare codes and standards industry wide, so that consumers (both domestic and overseas) have confidence in the standards under which production occurs. A

literature review conducted last year identified recording systems and benchmark data being used overseas. Particularly in Europe an extensive program is being funded by the EU (Welfare Quality) to implement a benchmarking system across all EU countries. While animal welfare may not be used as a trade barrier, concerns in Europe about imports from countries with lower welfare standards will no doubt be used in marketing EU products. Therefore it is important that Australia not only has similar welfare standards to the EU, but is also able to confirm this through reliable benchmark data on animal welfare. A welfare monitoring scheme should include animal-based measures, resource-based measures and management-based parameters. This project aims to identify recording systems already in place in the dairy and lamb industries that can be used for this purpose. In addition, where existing data are lacking, it will recommend where recording systems (i.e. QA systems) need to be developed.

Using machine vision to count hens and reduce egg breakage – proof of concept

Cronin

Poultry CRC Funded

Machine vision is defined as the ability of a computer to see. In a machine-vision system, video cameras supply information to a computer, and depending on the software, objects can be recognised, tracked and measured. Machine vision has been applied in industrial situations for over 10 years to automate decision-making and to record measurements on moving production lines. Labour is one of main cost factors affecting farm profitability. For the modern cage egg industry, machine vision offers a means to reduce unit labour inputs while increasing surveillance of the birds and mechanised processes such as egg collection.

Automatic monitoring of the birds should improve their management and potentially their welfare, while other aspects such as identifying blockages on egg collection belts before the belt moves could increase eggs sold by reducing the incidence of cracked and broken eggs. Thus, rather than a large proportion of stockperson time being spent in unprofitable monitoring activities, machine vision would monitor the birds and mechanical activities within the shed. In the event that a risk event occurs, it is detected by the machine vision and the stockperson is alerted to attend to the situation.

This project is testing the concept that machine vision can be used to 1) count the number of live hens per cage (with multiple hens/cage) and 2) identify potential blockages of the egg conveyor belt that may result in damaged eggs. It is feasible that in the future, this basic use of video image analysis will be coupled with other "smart sensing" technologies to enable the automatic monitoring of the health and welfare of individual birds.

Behavioural responses of dairy cows to mastitis: Indicators of pain, and welfare and productivity implications

Botheras, Hemsworth

DPI & OARDC Funded

The prevention and alleviation of pain are considered important factors in the ethical treatment and care of animals. Pain is also one of the most important aspects determining the welfare of farm animals. Mastitis (inflammation of the mammary gland) is the most prevalent disease in dairy cows and therefore, the welfare of many dairy cows may be at risk due to pain associated with this disease.

An experiment is being conducted to investigate behavioural, physiological, biochemical and production changes associated with experimentally induced mastitis, and also to evaluate an analgesic as an alleviator of clinical signs of pain and thus improvement in animal welfare and rapid return to peak performance.

A review and evaluation of strategies to manage unwanted cats and dogs in Queensland

Marston, Bennett

DPIF, QLD funded

This project was undertaken to provide an extensive review of strategies to control the population of unwanted cats and dogs, including mandatory identification, mandatory registration, mandatory desexing, mandatory containment, and trap, neuter, release programs. Interviews will be conducted with key stakeholders in Australian states where urban animal management legislation has been enacted and with key stakeholders in Queensland. An analysis of the public submissions received by the Queensland government in response to a Discussion Paper will be used to ensure that this review is aligned with local conditions and perspectives. A report will be generated summarising all available information and providing recommendations.

Program 3 Attitudes to animals and animal welfare, and farmer, consumer and community behaviour

Revision of Pig ProHand

Coleman and Hemsworth

APL Funded

Training of stockpeople as professional managers of pigs has, in the past, been largely ignored. In recognition of the vital role that stockpeople play in the overall productivity, welfare, and health of the livestock under their care, the Animal Welfare Science Centre (AWSC) developed a stockperson professional handling training program - ProHand pigs.

This program was developed over 10 years ago and is being revised to take into account some of the major technological changes which have occurred in the pork industry.

Field trial of pig stockperson selection

Coleman

APL Funded

The Stockperson Selection Aid (SSA) was developed by researchers at Monash University's Animal Welfare Science Centre in collaboration with the Victorian Institute of Animal Science. Its development is based on the findings of several years of research undertaken with stockpeople in the Australian pig industry.

The SSA is a tool that can be used by employers in the pig industry to guide the selection of stockpeople. Selected individuals will potentially improve the quality of their work team, maximise productivity and welfare and improve company profits. It should be made clear, however, that the selection of staff should be based on a range of key indicators. Accordingly, *the SSA is just one factor which should be taken into account when making employment decisions.*

This project is designed to test the utility of the SSA in a commercial environment. It has been put on the web by EPredix, USA. Over the next 18 months, several large pig producers will use the SSA to assist in stockperson selection and the usefulness of it will be assessed.

The welfare of recreational horses in Victoria: the occurrence of and factors associated with horse welfare

Coleman, Jongman and Hemsworth

BAW Funded

In Australia, the number of horse welfare problems investigated by the Royal Society for the Prevention of Cruelty to Animals (RSPCA) relative to other domestic animal problems remains high, with significant time and resources utilised in dealing with these problems. Research by Pearson (2004) found that owner attributes that were specifically correlated with reduced horse welfare were lack of commitment to horse ownership, the belief that horses made good companion animals, the belief that horses were difficult to care for, a low education and residing in the outer metropolitan area or the outer-fringes of the city. While this study highlighted the opportunity to reduce welfare issues in domestic horses by understanding owner characteristics, this study provided little information on the extent of animal welfare problems in recreational horses or indeed the extent of this relationship between owner characteristic and horse welfare in the broader and larger horse recreational group.

The Victorian Animal Welfare Advisory Committee's Working Group on the welfare issues associated with unidentified horses, cats and dogs has concluded that very little is known about the horse ownership in Victoria, mainly because of the lack of compulsory identification and registration of horses and the difficulty in contacting horse owners that are not members of horse clubs.

There is therefore an obvious need to identify horse numbers in Victoria and the circumstances surrounding their ownership such as participation in horse clubs and activities, foals produced, and surrender and euthanasia. Furthermore, understanding the occurrence and extent of horse welfare problems, as well as factors associated with these welfare problems would provide valuable information for the development and implementation of state and local government policy on responsible horse management.

A summary of Australian research pertaining to cat ownership and overpopulation

Marston, Bennett

BAW Funded

To date many separate pieces of research have been commissioned or conducted by the Bureau of Animal Welfare, Victoria. Each piece of research has been targeted at answering specific questions relating to reducing the levels of cat-over-population and euthanasia, whilst increasing desexing and registration rates. Currently there is no framework linking this research together in an easily accessible manner.

This summary will include, in addition, any relevant research which has been conducted elsewhere. This document will identify where gaps exist in current knowledge that need to be addressed in future research. In order to improve the accessibility of this research to the many stakeholders, the summary will be organised by topics such as ownership practises, barriers to increasing registration, identification and desexing rates and public perception of cats and the inter-relationships between these factors will be explored.

Characteristics of pets and owners who visit veterinarians

Marston & Bennett

BAW Funded

Little information is available regarding the types of cats and dogs presented to veterinarians, particularly with regard to their reproductive behaviour and the degree of movement that may exist between the fully-owned, semi-owned and stray populations. Nor do we know the extent that the progeny of owned animals contribute to shelter admissions?

The aim in this study is to further characterise the pets in our community, by surveying veterinarians and their clients and building upon existing data. This information will inform community discussions about mandatory desexing and early-age desexing and clarify the dynamics of pet animals moving between the postulated sub-populations of feral, stray and semi-owned animals.

Post-adoptive interviews conducted with people who have adopted cats from welfare shelters

Marston & Bennett

BAW Funded

Currently a far greater number of cats are admitted to welfare shelters than can be rehomed, resulting in almost half of all cats admitted to welfare agencies being euthanased. One way to reduce shelter admissions is to increase the retention of owned cats.

Recent research has identified that a large percentage of those cats admitted to shelters with implanted microchipped (who formed a very small percentage of total admissions) had been implanted in a shelter within a few months prior of their current admission. This suggests that, at least some of the animals rehomed by shelters may be prone to straying after rehoming, yet there is little post-adoptive data available to either support or refute this hypothesis. Previously a survey of people who adopted shelter dogs identified many factors that affected the success of the adoption and high-lighted the problems experienced.

The information gained from this study enabled some shelters to increase the rate of adoption, strategically target problem behaviours in pre-adoptive rehabilitation and provide post-adoptive training. This has resulted in fewer returns and greater owner satisfaction. It is possible that similar benefits could be identified for cats. During a recent cat tracking study, permission was obtained from 435 people who had adopted a cat, enabling us to collect post-adoptive information from them.

“Minimising Handling Stress” - Development of a prototype training package for farmers to improve their human-farm animals relationship

Coleman, Hemsworth

EU 6th Framework Funded

Multimedia-based cognitive behavioural approaches to stockperson training have been shown to produce a high level of behaviour change, to be appropriate for people with limited formal education and to be the preferred method of learning for stockpeople. Such training has been shown to improve stockperson animal handling, improve farm animal production and improve farm animal welfare.

This is a collaborative project within the EU 6th Framework Welfare quality program (Sub-project 3, Minimizing handling stress) will develop integrated, knowledge-based, practicable species-specific strategies to improve farm animal welfare. This prototype training package will be based on existing knowledge mainly coming from Australian and French research and development as well as information obtained from research in the EU.

ProHand for the livestock processing industry: a professional livestock handling package

Hemsworth and Coleman

Mintrac / MLA Funded

The current training materials for managing and handling animals in lairage at Australian abattoirs have been rewritten in 2005/6 to incorporate the new National Animal Welfare Standards. It was apparent in redeveloping these materials that while they deal well with the procedural and regulatory aspects of managing and handling animals at abattoirs, they may be deficient in providing detailed advice and instruction on the attitudes and behaviours that best achieve the desired results.

The proposed project will firstly assess the current attitudes and performance of our stock handlers and, if necessary, secondly address skills and attitude problems by enhancing out training programs.

With the further refinement of the QA standards for the livestock processing industry, there is the need to underpin the standards on a sound basis. One important strategy to underpin these standards is appropriate training support in the area of animal handling and stockpersonship.

Farm animal welfare in Ohio: Assessing public concern and implications for the food animal industry

G.Coleman, L.Lobao, M.Eastridge, P.Hemsworth, J.Sharp, N. St-Pierre

OARDC Funded

The livestock industries are facing new public pressures on a wide range of issues including animal welfare, but little is known about the US population's views and behaviour regarding the welfare of farm animals. A few opinion surveys have been used to collect information on animal welfare concerns, but questions about perceived treatment of food animals are even rarer. Because public attitudes have potential to dramatically affect use of animals, it is critical that we identify and understand these attitudes in a scientific and unbiased manner before making decisions. This project consists of two parts.

The first part is studying public attitudes and behaviour regarding farm animal welfare by identifying the range of attitudes about farm animal welfare that exist in the population and among key stakeholders and the social, economic, and demographic determinants of these attitudes, as well as investigating the degree to which attitudes affect consumption behaviours and community behaviours, such as political action for/against livestock farming.

The second part is studying the livestock industries' responses by determining the extent to which public and organizational pressures are affecting industry practices concerning animal welfare and the extent to which producers in these industries will adopt new protocols for animal treatment.

Human – animal relationships in the laying hen

Hemsworth, Coleman, Barnett

Poultry CRC Funded

This project focuses on the critical role of stockpeople to layer hen welfare. Research in a number of livestock industries has shown that interactions between stockpeople and their animals can limit the welfare of the animals (Hemsworth and Coleman, 1998). While these interactions may appear quite benign, this research has shown that the frequent use of some of these routine behaviours by stockpeople can result in farm animals becoming highly fearful of humans. It is these high fear levels, through stress, that limit animal welfare and productivity. While this research on human-animal interactions in the livestock industries has generally focused on the dairy and pig industries, there has been some limited research conducted on meat chickens and laying hens that indicate that high fear levels may limit the productivity and welfare of poultry (Barnett *et al.*, 1992, 1994; Cransberg *et al.*, 2000).

This project will utilise environmentally controlled cage layer farms in both Australia and the USA. The project will i) determine whether previous findings on fear-productivity links are still valid in modern production facilities using current strains of birds; ii) determine the human behaviours that regulate fear of humans in laying hens, following preliminary studies on an ethogram of human behaviours in the poultry shed and developing methodologies to observe human behaviours; and iii) determine the human attitudes that regulate fear provoking behaviours in humans towards laying hens.

Characteristics of successful human/dog relationships

Ley, Bennett

PIAS Funded

Dog owners are often advised to purchase certain breeds or types of dogs believed to have characteristics that will make them suitable companions. Very little research, however, has examined exactly what canine characteristics are important in determining the success of the human/dog relationship, what dogs display these characteristics and also, whether different types of owners are more or less satisfied with different types of dogs.

The aim is to use the internet to collect and collate, from a really large number of dog owners, information about the relationship they have with their dog and how satisfied they are with this relationship, information about their own characteristics, and information about the dog's personality and behaviour. This will allow us to describe different types of owners and the personality and behavioural profiles of those dogs that make the best companions for these different owner types.

At the end of the study we should have a much clearer understanding of how owner and dog characteristics interact to influence the strength of the dog-owner relationship and owner satisfaction.

We also hope to be able to produce a comprehensive and up-to-date description of different dog breeds and types, based on the experiences of a large number of Australian dog owners. This should help breeders develop appropriate breeding goals and also have clear benefits for both the dog owning public and Australian dogs.

Program 4 Tertiary and post-graduate education and training

Design and delivery of “Animals in Society” as part of the “Human and animal interactions” cluster at The Ohio State University.

Bennett, Lauber & Toukhsati

OSU Funded

“Animals in Society” (AIS) is an introductory course designed to introduce students to the social, cultural, economic and legal frameworks within which current human-animal relationships exist.

The course was developed by the Animal Welfare Science Centre in collaboration with the Department of Animal Sciences at OSU. AIS fulfils a Social Science elective and was offered for the first time during the autumn 2007 quarter.

Students in this course, explore a wide range of current animal roles with a view to broadening their understanding of how integral our relationships with animals are in maintaining human physical, social and psychological health and well-being. Currently, there is a wide range of views about animals, often based on misinformation and poorly informed value-based judgments.

AIS is designed to equip students with the knowledge and critical thinking skills necessary to address questions concerning how animals can best co-exist with human societies.

Students learn to appreciate the physical, social and psychological interdependence between species and be able to use the knowledge acquired to objectively, critically, and sensitively evaluate and comment on emerging issues regarding animals in society.

Implementation of Animal Welfare Standards into the meat chicken industry’s company QA programs

Barnett, Edge

Poultry CRC Funded

To increase implementation of animal welfare standards within the chicken meat industry, the Centre has formulated standards for the new ‘National Animal Welfare Standards for the Chicken Meat Industry’.

These industry standards have been developed as a single industry policy document and accompanying background information for industry training and separate manuals that cover the

individual industry sectors: meat chicken farming, the hatchery, breeders, pick-up and transport and processing.

The Centre has trained a number of industry trainers to assist industry participants (both broiler growers and company personnel) to integrate the information into their farm or company daily practices.

The workshops covered animal welfare legislation, public attitudes, customer requirement, the standards, recording, auditing and application of the standards and QA on farm. About 40 participants from at least 6 companies will have undertaken the training by the end of the project. These participants will then conduct further training within the companies.

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3. Conference publications

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4. Research Reports

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5. Theses

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ANIMAL WELFARE SCIENCE CENTRE SEMINARS

July 2007

Animal welfare groups' philosophies, priorities & programs on animal welfare

Speakers:

- Dr. Hugh Wirth, RSPCA (Vic) – *“RSPCA animal welfare philosophy & policies”*
- Glenys Oogjes, Animals Australia - *“Animal Australia’s philosophies, priorities & plans”*
- Carole De Fraga, Compassion in World Farming – *“CIWF’s philosophy, priorities & programmes”*

August 2007

Human-Animal interaction in the research setting

Speaker:

- Assoc. Prof. John Barnett, DPI Vic – *“ Policy on the care & use of sheep for scientific purposes”*

September 2007

Current animal welfare research at The Ohio State University

Speaker:

- Dr. Naomi Botheras: – *“Welfare research at The Ohio State University”*

Animal welfare research groups' philosophies, priorities & programs on Animal welfare

Speakers:

- Prof. Paul Hemsworth, Animal Welfare Science Centre – *“AWSC’s philosophy, priorities & programs”*
- Prof. Clive Phillips, Centre for Animal Welfare & Ethics - *“CAWE’s philosophies, priorities and programs”*
- Dr. Andrew Fisher, Animal Welfare Unit CSIRO – *“CSIRO animal welfare research - philosophy, priorities and programs”*

November 2007

Government agencies' philosophies, priorities & programs on animal welfare

Speakers:

- Dr. Steve Tate, Bureau of Animal Welfare – *“BAW’s philosophy, priorities & programs”*
- Dr. Robert Baker, Primary Industries & Resources SA - *“Animal welfare in SA”*
- Allan Sheridan, DAFF – *“The Australian Animal Welfare Strategy”*

December 2007

AWSC companion animal research update

Speakers:

- Scientists and students of the Animal Welfare Science Centre

March 2008

Livestock export

Speaker:

- Prof. Clive Phillips, Centre for Animal Welfare & Ethics – *“Welfare aspects of the live export of sheep and cattle”*

Duty of Care / Public education

- Prof. Alistair Lawrence, Head of Animal Welfare, Scottish Agricultural College, - *“Improving public attitudes and behaviour to animals”*
- Prof. Grahame Coleman, Animal Welfare Science Centre - *“Public education”*

May 2008

Remote sensing

- Dr. Ian McCauley, DPI Victoria – *"Remote monitoring of livestock: Wireless and the Wii - improving livestock welfare"*
- Dr. Andrew Bubb, Desert Knowledge CRC - *"Remote management of cattle in central Australia. Current applications and opportunities for the future"*
- Tim Stockman, Stockman Electronics - *"The physical limitations of wireless sensing technologies to monitor livestock."*
- Dr. Greg Cronin, DPI Victoria - *"Using machine vision (automatic video image analysis) to monitor hens in cages"*

Copies of the Animal Welfare Science Centre Annual Report 2007 – 2008 are available on request from:

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