



LARGE ANIMAL EMERGENCY RESCUE TRAINING



Melinda Howlett & Celia Turnbull

AgriFood Skills International Fellowship

Fellowship funded by AgriFood Skills Australia



ISS Institute

Suite 101
685 Burke Road
Camberwell Vic
AUSTRALIA 3124

Telephone

03 9882 0055

Facsimile

03 9882 9866

Email

issi.ceo@pacific.net.au

Web

www.issinstitute.org.au

Published by International Specialised Skills Institute, Melbourne.

ISS Institute
101/685 Burke Road
Camberwell 3124
AUSTRALIA

Also extract published on www.issinstitute.org.au

© Copyright ISS Institute 2009

This publication is copyright. No part may be reproduced by any process except in accordance with the provisions of the Copyright Act 1968.

Whilst this report has been accepted by ISS Institute, ISS Institute cannot provide expert peer review of the report, and except as may be required by law no responsibility can be accepted by ISS Institute for the content of the report, or omissions, typographical, print or photographic errors, or inaccuracies that may occur after publication or otherwise. ISS Institute do not accept responsibility for the consequences of any action taken or omitted to be taken by any person as a consequence of anything contained in, or omitted from, this report.

Executive Summary

Melinda Howlett and Celia Turnbull were privileged to be awarded the inaugural ISS Institute AgriFood Skills International Fellowship. The Fellowship was used to investigate and learn specialised techniques in Large Animal Emergency Rescue methods from experts in the UK and the USA.

The description 'Large Animal Emergency Rescue' refers to the practice of rescuing individual large animals from hazardous situations. This is distinct from the 'rescue' by animal welfare personnel of an animal from abuse or neglect situations.

The impetus for pursuing this training was the Fellows' personal involvement in a number of serious, distressing and costly situations involving animals caught in hazardous situations. The importance of understanding how to act in emergencies involving animals was further highlighted in the recent Victorian bushfire tragedies.

The rescue of large animals in emergency situations is a difficult and risky business. Horses, cattle and other large heavy animals can find themselves trapped in predicaments such as having fallen into rivers, down cliffs, into wells, drains, caves and trapped in boggy dams.

Similarly, injured recumbent animals are difficult to move to safe ground where veterinary attention can be given. For example, animals injured on roadways during traffic accidents, on the racetrack or injured within the confined space of an animal transportation vehicle, all require specialised rescue techniques to remove the animal and allow for safe treatment of the animal.

Large animals are a valuable economic commodity of the Australian agricultural, export and racing Industries. Equally, animals are a valuable social commodity and Australians have a very high personal emotional attachment to their animals. A study in the USA revealed that more than 80 per cent of animal owners would risk their own lives in order to save their animal. This highlights the importance and necessity of the safe rescue of animals.

In many countries, a 'natural disaster planning protocol' involving the management and rescue of animals during times of floods, fires and droughts is in place. Emergency personnel are trained in horse and cattle handling skills to deal with these situations.

The rescue of large animals in emergency situations is carried out in Australia under various local and state by-laws and statutes, by rangers, council and park officials, veterinarians, animal welfare workers such as Royal Society for Prevention of Cruelty to Animals (RSPCA)), and by emergency response personnel such as police, fire and state emergency services. These services are fragmented and often involve rescue personnel with little or no training in animal handling and rescue techniques. Many times, the emergency intervention is carried out by members of the public, including the animal owners, or members of the farming community (depending on the nature of the emergency), often at great risk to personal safety.

There is no national or state standard for dealing with large animal emergencies, other than those involving exotic disease outbreaks.

Howlett and Turnbull interviewed a number of leading large animal rescue specialists and animal disaster management planners in the UK and in various states of USA, including North Carolina, and Kentucky. They undertook training courses conducted by the British Equine Veterinary Association and the Hampshire Fire Rescue Service in the UK, and with the Technical Large Animal Emergency Rescue trainers, Dr Tomas and Rebecca Gimenez, in Kentucky, USA.

Executive Summary

They also discussed training procedures with Dr Richard Mansmann, Clinical Professor at North Carolina State University College of Veterinary Medicine, and with John and Deb Fox from the Large Animal Rescue Company, Felton Fire Department, California. They discussed animal disaster planning and mitigation with Chester Lowder, Executive Director of North Carolina (NC) State Animal Response Team (SART) and Sharron Stewart, Director of Emergency Programs Division, North Carolina Department of Agriculture and Consumer Services.

The training involved hands-on practical training using mannequin and live animals (horses and llamas) in many rescue techniques, with thorough instruction in safety, scene management, animal behaviour and handling, extrication techniques and animal first aid.

The aim of this Fellowship was to bring back specialised rescue skills that can be passed on in training programs for the range of Australians involved with animals, from horse owners, farmers, veterinarians, animal welfare officers, and rangers to horse trainers, racing officials, livestock transporters and emergency personnel. The overall aim of each rescue is to maximise the chances of a positive outcome for the animal, avoiding animal deaths, plus ensuring the safety of all involved personnel.

The Fellows believe that this report will inspire the beginnings of an appreciation within Australia for the need for a national coordinated approach to animal emergency rescue and animal disaster response and mitigation, and will provide a skill and knowledge framework for undertaking such work.

Table of Contents

| | |
|------------|--|
| i | <i>Abbreviations and Acronyms</i> |
| iii | <i>Definitions</i> |
| 1 | Acknowledgements |
| 1 | Awarding Body - International Specialised Skills Institute (ISS Institute) |
| 2 | Fellowship Sponsor |
| 2 | Supporters |
| 3 | Australian Organisations Impacted by Large Animal Emergency Rescue |
| 4 | About The Fellows |
| 4 | Fellow 1: Melinda Howlett |
| 5 | Fellow 2: Celia Turnbull |
| 6 | Aims of the Fellowship Programme |
| 7 | The Australian Context |
| 7 | Description of the Industry |
| 8 | Benefits of the Fellowship |
| 9 | SWOT Analysis |
| 11 | Identifying Skills Deficiencies |
| 15 | The International Experience |
| 15 | Rescue and Emergency Medicine Training for Equine Vets |
| 26 | NC SART and NC DACS Meeting |
| 32 | NC SART and NC State University Meeting |
| 32 | Technical Large Animal Emergency Rescue (TLAER) |
| 43 | Hagyard Equine Medical Institute Meeting |
| 44 | Large Animal Rescue Company/Felton Fire Department Meeting |
| 46 | Knowledge Transfer: Applying the Outcomes |
| 46 | Immediate Plans |
| 46 | Future Plans |
| 47 | Recommendations |
| 47 | National Training Packages |
| 47 | Increase Large Animal Rescue Incidents Awareness |
| 48 | Delivery of LAER training |
| 48 | Provision of Large Animal Rescue Services |
| 48 | Animal Disaster Planning |
| 49 | International Specialised Skills Institute |
| 50 | Further Skills Deficiencies |
| 50 | Conclusion |
| 51 | References |

Abbreviations and Acronyms

| | |
|---------------|--|
| AVA | Australian Veterinary Association |
| BEVA | British Equine Veterinary Association (UK) |
| CAMET | Companion Animal Mobile Equipment Trailer (USA) |
| CART | County Animal Response Teams (USA) |
| CFA | Country Fire Authority (AUS) |
| CPDM | Community Preparedness and Disaster Management |
| DPI | Department Primary Industries |
| DSE | Department Sustainability and Environment |
| EMA | Emergency Management Australia |
| EVA | Equine Veterinary Association |
| EMAC | Emergency Management Assistance Compact |
| FEMA | Federal Emergency Management Agency (USA) |
| FRS | Fire and Rescue Services |
| GDP | Gross Domestic Product |
| GOTAFE | Goulburn Ovens Institute of TAFE |
| Hazmat | Hazardous Materials |
| HEART | Humane Equine Aid and Rapid Transport (a trademarked name of equine ambulances in USA) |
| HFRS | Hampshire Fire and Rescue Services (UK) |
| ICS | Incident Command System |
| ISS Institute | International Specialised Skills Institute |
| LAER | Large Animal Emergency Rescue |
| LAR | Large Animal Rescue |
| MRI | Magnetic Resonance Imaging |
| MRV | Multi-Role Vehicle |
| NC | North Carolina (USA) |
| NCDA&CS | The North Carolina Department of Agriculture and Consumer Services |

Abbreviations and Acronyms

| | |
|--------|---|
| NCDEA | National Centre for Dairy Education Australia |
| NCEE | National Centre for Equine Education (AUS) |
| NERS | National Emergency Response System (USA) |
| NEMS | National Emergency Management System (USA) |
| NSAIDS | Nonsteriodal Anti-inflammatory drugs |
| OHS | Occupational Health and Safety |
| POST | Peace Officer Standards Training |
| PPE | Personal Protective Equipment |
| RSPCA | Royal Society for the Prevention of Cruelty to Animals (AUS) |
| RVL | Racing Victoria Ltd |
| SART | State Animal Response Team (USA) |
| SERT | State Emergency Response Team (USA) |
| SES | State Emergency Services (AUS) |
| SOP | Standard Operating Procedures |
| TLAER | Technical Large Animal Emergency Rescue (a specific program of training in the technical aspects of large animal emergency rescue techniques, Gimenez, USA) |
| USAR | Urban Search and Rescue |
| VFF | Victorian Farmers Federation |
| VMAT | Veterinary Medical Assistance Teams |

Definitions

- Design** Design is problem setting and problem solving.
- Design is a fundamental economic and business tool. It is embedded in every aspect of commerce and industry and adds high value to any service or product - in business, government, education and training and the community in general.
- Reference: 'Sustainable Policies for a Dynamic Future', Carolynne Bourne AM, ISS Institute 2007.*
- Skills deficiency** A skill deficiency is where a demand for labour has not been recognised and where accredited courses are not available through Australian higher education institutions. This demand is met where skills and knowledge are acquired on-the-job, gleaned from published material, or from working and/or study overseas.
- There may be individuals or individual firms that have these capabilities. However, individuals in the main do not share their capabilities, but rather keep the IP to themselves; and over time they retire and pass away. Firms likewise come and go.
- Reference: 'Directory of Opportunities. Specialised Courses with Italy. Part 1: Veneto Region', ISS Institute, 1991.*

Acknowledgements

Melinda Howlett and Celia Turnbull would like to thank the following individuals and organisations who gave generously of their time and their expertise to assist, advise and guide them throughout the Fellowship programme.

Awarding Body – International Specialised Skills Institute (ISS Institute)

The International Specialised Skills Institute Inc is an independent, national organisation that for over two decades has worked with Australian governments, industry and education institutions to enable individuals to gain enhanced skills and experience in traditional trades, professions and leading-edge technologies.

At the heart of the Institute are our Fellows. Under the **Overseas Applied Research Fellowship Programme** the Fellows travel overseas. Upon their return, they pass on what they have learnt by:

1. Preparing detailed reports to government departments, industry and education institutions.
2. Recommending improvements to accredited educational courses.
3. Offering training activities including workshops, conferences and forums.

Over 180 Australians have received Fellowships, across many industry sectors.

Recognised experts from overseas also conduct training activities and events. To date, 22 leaders in their field have shared their expertise in Australia.

According to Skills Australia's 'Australian Workforce Futures: A National Workforce Development Strategy 2010':

Australia requires a highly skilled population to maintain and improve our economic position in the face of increasing global competition, and to have the skills to adapt to the introduction of new technology and rapid change.

International and Australian research indicates we need a deeper level of skills than currently exists in the Australian labour market to lift productivity. We need a workforce in which more people have skills, but also multiple and higher level skills and qualifications. Deepening skills across all occupations is crucial to achieving long-term productivity growth. It also reflects the recent trend for jobs to become more complex and the consequent increased demand for higher level skills. This trend is projected to continue regardless of whether we experience strong or weak economic growth in the future. Future environmental challenges will also create demand for more sustainability related skills across a range of industries and occupations.¹

In this context, the Institute works with Fellows, industry and government to identify specific skills in Australia that require enhancing, where accredited courses are not available through Australian higher education institutions or other Registered Training Organisations. The Fellows' overseas experience sees them broadening and deepening their own professional practice, which they then share with their peers, industry and government upon their return. This is the focus of the Institute's work.

For further information on our Fellows and our work see www.issinstitute.org.au.

Patron in Chief

Lady Primrose Potter AC

Board Chairman

Ms Noel Waite AO

Board Members

Mr Mark Bennetts

Mr Franco Fiorentini

Sir James Gobbo AC, CVO

Mr John Iacovangelo

Mr David Wittner

Chief Executive Officer

Mr Jeremy Irvine

¹ Skills Australia's 'Australian Workforce Futures: A National Workforce Development Strategy 2010', pp. 1-2 http://www.skillsaustralia.gov.au/PDFs_RTFS/WWF_strategy.pdf

Acknowledgements

Fellowship Sponsor

AgriFood Skills Australia is the Industry Skills Council for the agrifood industry: the rural and related industries, food processing (including beverages, wine and pharmaceuticals), meat, seafood and racing. Howlett and Turnbull would like to thank them for providing funding support for this Fellowship.

Supporters

- Neil Aird, Primary Industries Division, Goulburn Ovens Institute of TAFE
- Phil Campbell, NSW State Emergency Service, Sydney, NSW
- Peter Carkeek, National Centre for Dairy Education
- Paul Culpan, Chief Executive Officer, Goulburn Ovens Institute of TAFE
- Julie de Hennin, Alpine Valley Agribusiness Forum
- Maria Mercurio, Chief Executive Officer, RSPCA, Victoria
- Bill Taylor, NSW State Emergency Service, Turramurra, NSW
- Daniella White, National Centre for Equine Education

Individuals and Organisations Involved in the Fellowship Programme

UK and Ireland

- Jim Green, Rural Safety Officer (Animal Rescue Specialist), Hampshire Fire and Rescue Service, Lyndhurst, Hampshire, UK
- Anton Phillips, Watch Manager (Animal Rescue Specialist), Eastleigh Fire Station, Hampshire Fire and Rescue Service, Lyndhurst, Hampshire, UK
- Rachel Saltmarsh and Josh Slater, Rescue and emergency medicine training for equine veterinarians, Joint British Equine Veterinary Association (BEVA)/Hampshire Fire and Rescue Services, Lyndhurst, Hampshire, UK

USA

- Larry Collins, Eastern Kentucky University,, Richmond, Kentucky, USA
- John and Deb Fox, Large Animal Rescue Company, Felton, California, USA
- Rebecca and Tomas Gimenez, Technical Large Animal Emergency Rescue (TLAER), South Carolina, USA
- Chester Lowder, State Animal Response Raleigh,, North Carolina, USA
- Nicole Tomlinson, Hagyard Equine Medical Institute, Lexington, Kentucky, USA

Individuals and Organisations Involved in the Fellowship submission

- Arthur Blewitt, AgriFood Skills Australia
- David Forbes, Rural Skills Australia
- Peter Orinuela, Livestock Transport Group
- Bill Sykes, MP, Benalla, Vic

Acknowledgements

Australian Organisations Impacted by Large Animal Emergency Rescue

Government

- Department Primary Industries (DPI)
- Department Sustainability and Environment (DSE)
- Local council animal control departments
- State Emergency Services (SES)
- State and Federal Police
- State Fire fighting associations, such as Country Fire Authority (CFA), NSW Fire Brigade

Industries

- Animal Care and Veterinary Industries
- Primary Industries and Agriculture
- Horse Racing Industry
- Livestock Industries
- Pleasure Horse and Equestrian Industry

Professional Associations

- Australian Veterinary Association (AVA)
- Equine Veterinary Association (EVA)
- Racing Victoria Ltd (RVL)
- Victorian Farmers Federation (VFF)

Education and Training Organisations

- Goulburn Ovens Institute of TAFE (GOTAFE)
- National Centre for Dairy Education Australia (NCDEA)
- National Centre for Equine Education (NCEE)
- Veterinary and agricultural colleges and universities

Community

- Animal welfare and rescue groups
- Royal Society for Prevention of Cruelty to Animals (RSPCA)
- Wildlife rescue groups

Others

- Individual animal owners

About The Fellows

Fellow 1: Melinda Howlett

Current Employment

- Course Coordinator - Certificate II in Equine Industry, National Centre for Equine Education

Qualifications

- Degree of Applied Science (Equine Studies), Charles Sturt University, Wagga Wagga, New South Wales, 1994–1996
- Certificate IV in Assessment and Workplace Training, Goulburn Ovens Institute of TAFE, Wangaratta, Victoria, 1996
- Level 2 First Aid Certificate, Rich River First Aid Training, Moama, Victoria/New South Wales, 1997
- Diploma of Stud Management, Vocation Qualification – Racehorse Care Level 2 (Breeding), The National Stud, Newmarket, England, 1997
- Graduate Diploma of Education – Secondary, University of Canberra, Canberra, Australian Capital Territory, 2001–2002
 - Science (Biology, Chemistry and Physics)
 - Agriculture

Professional Memberships

- North East Young Professionals, Wangaratta
- State Emergency Services, Wangaratta
- Victorian Racing Club

Biography

Howlett is a highly dedicated horseperson with over 15 years experience in breeding, racing, information provision, marketing and teaching for the thoroughbred industry. This experience has been gained through employment as foreman at Online Racing Stables, Kembla Grange, and stud hand at the Rathbarry Stud in Ireland. She worked in sales and marketing for AAP Racing Information Services, and was assistant manager at Berant Park, Canberra, a thoroughbred breeding, training and spelling establishment.

Howlett has undertaken university training in both equine and educational studies, with a Degree in Applied Science (Equine Studies), a Diploma of Stud Management and a Graduate Diploma of Education (Secondary). In 1997 she won the Newmarket Scholarship for The National Stud, England.

Howlett has been employed by the National Centre for Equine Education since 2006 and is currently the Course Coordinator for the Certificate II in Equine Industry program.

Howlett is motivated by success and has a thirst for lifelong learning to expand her skills. She strives to develop new training within the equine industry.

About The Fellows

Fellow 2: Celia Turnbull

Current Employment

- Acting Manager Animal Sciences Department (incorporating National Centre for Equine Education), Goulburn Ovens Institute of TAFE.

Current Responsibilities

- Chair, Animal Care and Management Training Package Provider Network (Vic)
- Member, Animal Ethics Committee, Goulburn Ovens Institute of TAFE

Qualifications

- Bachelor Veterinary Science, University of Sydney, New South Wales, 1989
- Certificate IV in Assessment and Workplace Training, Adult Education Centre, Wangaratta, Victoria, 2004
- Graduate Diploma (VET) Education, La Trobe University, Wodonga, Victoria, 2005
- Certificate IV Training and Assessment (TAA), Goulburn Ovens TAFE, Wangaratta, Victoria, 2007
- Graduate, Alpine Valleys Community Leadership Program, Wangaratta, Victoria, 2007–2008
- Masters in Education, Monash University, Melbourne, Victoria, 2009–present

Professional Memberships

- Australian Veterinary Association

Biography

Turnbull is based at the National Centre for Equine Education Campus at Wangaratta and is involved in the development and management of Equine, Veterinary Nursing and Animal Care programs.

She is an experienced veterinarian with 12 years practice ownership in a partnership of six veterinary practices in Southern Sydney, treating small animals and wildlife. She also has five years experience as an Associate Veterinarian in mixed practice in North East Victoria and South East NSW.

As an undergraduate Turnbull worked in a variety of jobs including veterinary nursing, pet retail, laboratory assistant, marine aquarium attendant and as a horse-rail riding guide.

Turnbull is passionate about quality training in animal care, and has a keen interest in emergency veterinary medicine.

Aims of the Fellowship Programme

The rescue of large animals from hazardous situations is a difficult and often risky business. Horses, cattle and other large heavy animals can find themselves trapped in natural or man-made predicaments, such as fallen into rivers, down cliffs, into wells, drains and caves and trapped in boggy mud.

Injured recumbent animals can also be difficult to move to safe ground before veterinary attention can be given. For example, horses injured on roadways during traffic accidents, on the racetrack or injured within the confined space of an animal transportation vehicle, all require specialised rescue techniques to remove the animal and allow safe treatment of the animal.

This AgriFood Skills International Fellowship enabled Howlett and Turnbull to identify and learn the specialised techniques in large animal rescue in order to achieve their ultimate goal of improving the training available to Australian animal care workers, emergency personnel and animal owners. A holistic approach was identified, which will maximise the chances of a positive outcome for the animal and avoid animal deaths, while ensuring the safety of all involved personnel.

The specific aims of this Fellowship were to:

- Complete the 'Technical Large Animal Rescue' training course. This training is the blending of technical skills applied with an understanding of prey animal behaviour and
- The road, large animals stuck in mud or holes, and incidents where people might be trapped with the animal.
- Characteristics to resolve an incident involving a trapped or incapacitated animal.
- Learn the methods of rescuing and treating large animals in emergency situations while maintaining the safety of rescuers, the public and the animal.
- Learn the skills necessary to safely prepare for and approach large animal incidents such as overturned and wrecked livestock trucks, trailers and floats, large animals loose on Understand the behaviour of large animals in rescue situations.
- Learn how to establish and coordinate a large animal emergency rescue team.
- Learn the decision-making skills needed for choosing appropriate rescue methods in various emergency situations.
- Promote the establishment of large animal ambulance and rescue services within Australia.
- Learn the skills required to develop and deliver training courses in the emergency rescue of large animals to cattle and equine industry workers and large animal/equine owners.
- Learn skills in order to deliver training to members of emergency rescue organisations in specialised rescue techniques and specialised rescue equipment.
- Establish links with training organisations in the USA and UK that offer 'large animal rescue' training to people from a diverse range of backgrounds including equine, large animal, and mixed animal veterinarians, zoo and wildlife veterinarians, veterinary technicians, emergency response personnel (fire-fighters, police, emergency volunteers) and horse owners and cattle farmers.
- Promote the safe and rapid rescue of large animals to maximise animal welfare and survival.

The Australian Context

Description of the Industry

The following information was provided by Arthur Blewett, CEO, AgriFood Skills Australia:

The rescue of large animals in emergency situations is carried out in Australia under various local and state by-laws and statutes, by rangers, council and park officials, veterinarians, animal welfare workers such as RSPCA and by emergency response personnel such as police, fire and SES. Much of this emergency intervention is the task of members of farming communities (depending on the nature of the emergency), or by racing officials at race tracks[sic], or by staff at saleyards, or in relation to various livestock enterprises for domestic or international trade.

These services are fragmented and local and regional. The assembly of a body of knowledge through this Fellowship leading to a dedicated common service structure that could be introduced across regional Australia would have great merit, and could see the start of a national approach.

Much of this responsibility falls under the racing and livestock industries. The racing industry in Australia generates more than \$10 billion annually (2004 figures) and it creates approximately 92,000 full-time equivalent jobs. Australian bred horses and Australian animal husbandry practices are highly regarded internationally and the industry operates in a niche export area with high growth potential. The industry revolves around the concepts of breeding, owning, training, and racing animals in industry regulated competition.

Statistics source: AgriFood Skills Australia, Racing, viewed 30 September, 2009
<http://www.agrifoodskills.net.au/aboutus/committees/agrifood-racing-standing-committee/about-racing/0>

In 2002–2003 rural and related industries contribute around 3.2 per cent of Australia's Gross Domestic Product (GDP) and 24 per cent of export revenue.

Source: <http://www.agrifoodskills.net.au/aboutus/committees/rural-standing-committee/about-rural/>

Collectively, the rural sector employs between 374,000 and 400,000 people, most of whom live and work in regional and rural areas in the areas of:

- rural production (mainly crop and livestock enterprises)
- amenity horticulture
- conservation and land management
- animal care and management (including veterinary nursing and companion animals).

The main characteristic of the rural/agricultural workforce is the predominance of family owned and managed businesses. Corporate farming is just a small part of the total industry. It is concentrated mainly, but not exclusively, in the dry-land pastoral regions of Australia. As the necessary capital required to own and operate an agricultural business increases, there is a trend towards company based structures, particularly in the eastern states.

The Australian Context

This is providing new opportunities for career managers of large, well improved and financed farming businesses.

These references give some idea of the vast scale of the industry and the enormous number of livestock that are involved.

There are national structures in place under Animal Health Australia to cater for disease threat and disease mitigation, such as equine influenza. This operates at a national level and deals with issues such as bio-security and the inherent risks to rural markets. There is no national or state standard for dealing with other large animal emergencies.

This Fellowship serves to align the existing fragmented ways of dealing with large animal emergencies. It will have the effect of drawing attention to the plight of large injured animals and provide a holistic and practical way to respond to such emergencies.

How the Need for Additional Skills was Recognised

There have been many anecdotal stories related to the Fellows from various people, including members of the public, emergency workers, veterinarians, animal welfare workers, racing officers, horse owners, farmers, livestock transporters as well as media stories about emergency situations that animals have suffered. Both Fellows have also been personally involved in a number of incidents involving large animals requiring emergency rescue. These incidents have highlighted the lack of a coordinated approach to emergencies, plus the ignorance of using correct techniques to safely and successfully extract animals from emergency situations.

Internationally and within Australia, there is a growing appreciation of the safety and welfare of animals, and how individuals and industry use and care for animals.

There is no formal training in Australia for animal workers or emergency personnel in safe and correct techniques for large animal rescue. This contrasts to the growing international trend of delivery of basic and advanced training courses on this topic, plus the development of businesses and organisations (or departments within organisations) dedicated to providing these rescue services.

Benefits of the Fellowship

- Development of a holistic Australian resource of emergency response personnel skilled in large animal rescue procedures.
- Improved awareness of emergency personnel in the risks associated with large animal rescue emergency situations.
- Increased general public awareness of animal behaviour in emergency situations to reduce public injuries.
- Improved survivability and quality of life of animals from an animal welfare perspective.
- Improved survivability of animals from an economic perspective.
- Improved public awareness and positive public perception of animal welfare in Australia.
- Improved confidence of animal owners and carers in dealing with emergency situations.
- Improved awareness of lay personnel in the legal restrictions surrounding use of medication and acts of veterinary science.

The Australian Context

- Improved networking and communication between emergency agencies and veterinarians.
- Improved Occupational Health and Safety (OH&S) and animal welfare standards at industry events such as horse racing, eventing, high-country trail riding, show jumping, rodeos, saleyards, agricultural and equestrian shows.
- Establishment of a large animal rescue ambulance services in Australia.
- Enabling Australia to match world-class standards in large animal rescue.

SWOT Analysis

Strengths

- Improved safety of public and emergency workers.
- Improved welfare of animals.
- Reduced economic losses through loss of livestock.
- Improved relationships and networks of state emergency and animal welfare bodies.
- Increased public awareness of large animal emergency rescue.
- Formation of cooperative and coordinated approach to large animal emergencies.
- Creation of training opportunities for a range of industries, such as:
 - cattle industry
 - various equine industries.
- The Fellows' professionalism, experience and dedication.
- Support from stakeholders and AgriFood Skills Australia.
- Support from Goulburn Ovens TAFE

Weaknesses

- Time commitment required for forming the necessary networks and relationships between state bodies and community groups.
- Lack of public and industry awareness of training availability and need.
- Cost of developing accredited training courses.
- Cost of specialist rescue equipment and training aids.

Opportunities

- Large potential market for training opportunities to groups such as:
 - veterinarians
 - veterinary lay staff and students
 - horse owners
 - farmers
 - livestock transport workers
 - emergency services, fire and police
 - volunteer organisations such as SES, RSPCA
 - horse racing officials.

The Australian Context

- To build international ties and relationships.
- To raise Australia to international standards.
- To provide nationally recognised training.
- To create employment opportunities in this field.

Threats

- Different legislative requirements at a state level.
- Lack of support from some competing organisations.
- Accessibility of training and training facilities across Australia.
- Geographical challenges to the development of a comprehensive coverage of trained personnel across Australia.
- Distance and accessibility of experienced international professionals.

Identifying Skills Deficiencies

The equine and livestock industries play major economic and social roles within Australia, and the need for trained personnel to deal with large animal emergencies is starting to be appreciated. Untrained people will risk personal injury to rescue animals in distress, and poor rescue techniques may result in injury and subsequent death of the animals.

There are no formal training programs available in Australia for emergency personnel or animal workers that provide the total skills required for safe and humane animal rescue techniques.

The skills and knowledge deficiencies identified include the following:

Interpretive, Evaluative and Decision-Making Skills in the Face of Large Animal Emergencies

People responding to large animal emergencies require the ability to assess the emergency situation, understand the hazards to the animal, assess the risks to emergency responders and make decisions regarding the best rescue techniques appropriate to the situation.

Emergency Situation Management Techniques

Emergency situation management includes the initial response, gathering details of the exact nature of the emergency, dealing with straying/loose animals, coordinating rescue teams and professionals such as veterinarians, coordinating animal rescue vehicles (extrication/lifting equipment, boats and large animal ambulances), coordinating rescue and safety equipment, and first aid and rescue procedures.

Emergency situations can include animals involved in traffic accidents, transportation accidents, fires, falls, recumbent animals, trapped animals, escaped animals, injured, infectious, dying and dead animals. Examples of large animals are cattle, horses, swine, camels, alpacas/llamas, kangaroos, and exotic/zoo animals. Emergency situation management will often also involve liaisons with the media.

A number of personnel from various emergency agencies may be involved on scene, such as police, SES, veterinarian, members of the public, and the animal's owners. A holistic approach, providing safe, organised and efficient rescue is critical to ensuring safety of all personnel and allowing for the best outcome for the animal. Emergency situation management techniques involve good communication skills, with an incident commander who undertakes a risk assessment, assigns tasks to rescue team members, calms animal owners and members of the public, and coordinates a smooth and effective rescue operation.

Recognition and Interpretation of Animal Behaviour in Emergency Situations

Recognition and interpretation of animal behaviour in emergency situations is critical. Large animals involved in emergency situations can be in a fight-or-flight survival mode, frightened, panicked, and protective against further intervention. Large animals are dangerous and can easily injure or even kill untrained rescuers who are trying to help through striking, kicking and crushing. Horses and cattle can weigh between 500 and 1200kgs, and crushing injuries to personnel are a huge risk. Emergency response vehicles with flashing lights and sirens, and personnel with very noticeable uniforms can actually severely increase animals' fear and distress.

Understanding the individual animal's behaviour will also allow assessment of the animal's state of health, so that appropriate first aid measures can be given.

Identifying Skills Deficiencies

Understanding of Physiological Changes in Distressed, Injured and Recumbent Large Animals

Physiological changes associated with distress, injury and recumbence will impact upon the animal's likely chances of unimpaired survival post-rescue. The abnormal positioning of a heavy animal, and the length of time the animal is immobile will impact upon its survivability, with further damage occurring to skin, muscles and joints, and impairment of the blood supply to the tissues and organs. Changes in digestive systems often occur, which can result in endotoxic shock.

Hypothermia and hyperthermia due to the elements will also lead to shock. Excessive length of time in water or mud can lead to irreversible skin loss and foot disease.

Serious injury including airway impairment and haemorrhage will impact upon survival. Spinal, head and limb injuries often result in the need for euthanasia.

Large Animal First Aid Techniques

Assessment of vital signs and extent of injuries, and first aid treatment both prior to extrication and post-rescue must be carried out with the safety of personnel as the first priority. While first aid techniques are currently well understood, the application of first aid to large animals in rescue situations requires specialised training.

Seeking Professional Assistance

Understanding who to call for further assistance is very important. A network of emergency contacts for each district needs to be established, including rescue organisations, police and on-call large animal/equine veterinarians.

Humane Destruction

Rescuers need the ability to recognise those animals that will not recover from the emergency situation, and understand the methods of humane euthanasia for various animal species.

Legal Aspects

Rescuers need to understand their legal responsibilities with regards to the Prevention of Cruelty to Animals Act, and legislation regarding the use of therapeutic drugs (especially sedatives and analgesics), acts of veterinary science, and acts of euthanasia.

The Various Types and Usage of Large Animal Rescue Equipment

Ignorance of the correct use of restraint and rescue equipment, such as ropes, or using brute force can result in pain and suffering and permanent injury to the animal.

Personnel require training in the choice of appropriate equipment for different rescue situations, the correct application of the equipment to the animal, the correct methods of use, and the safe use of the equipment. This training is currently not available in Australia. Equipment can include ropes, knots, slides, slings, winches, pulleys and A-frames.

Containment and Restraint of Animals

This session covered containment of loose/escaped animals, including the containment of ambulatory and semi-ambulatory injured animals through capture techniques, restraint equipment such as halters and ropes, manual handling and physical barriers, always taking into account the safety of personnel and the animal.

Identifying Skills Deficiencies

Use of Sedatives and Tranquillisers in Rescue Situations

This includes the understanding of categories of drugs, administration techniques, drug actions and interactions, implications of use, and legal regulations.

Rescue Ropes and Knots

This includes the understanding and practical application of a variety of rope types and sizes, knot types, and the correct use for the safety of the animal.

Vertical Lifts

Vertical lifts are techniques employed for lifting animals up to extract them from situations such as deep holes. Appropriate vertical lift techniques and equipment are used for different rescue situations. Safety aspects for personnel must be taken into account and the implications of the techniques upon the animal's health and wellbeing must be understood.

A-Frame

A-Frame equipment is for lifting, and includes the correct methods of construction, set up and use including winches and pulley systems.

The Application of Rescue Techniques in Large Animal Rescue Situations

Backwards Drag

A technique where the animal is restrained onto a rescue 'glide' and then dragged backwards out of danger.

Cast Animals

Cast animals are animals unable to rise. This involves the safe approach and evaluation of animal's health status, and decision making for the best rescue technique.

Transport Vehicle Accidents

This involves the safe approach to animals within confined spaces, the evaluation of animal's health status, and decision making for the best rescue techniques.

This also involves techniques and equipment used to right toppled vehicles and remove them from accident scene.

Fire

Rescue of large animals from bushfires and burning buildings involves understanding of fire behaviour, personal safety, rescue equipment, personal protective equipment, animal distress and behaviour, and rescue techniques.

Water Rescue

The use of flotation devices, watercraft and rescue techniques for animals requiring rescue from water bodies or crossing water bodies, plus the consideration of thermal loss and safety of personnel and animals.

Mud Rescue

The use of rescue equipment and specialised rescue techniques for animals trapped in deep mud, through overcoming suction forces with equipment such as slings, glides, winches and pullies, taking into consideration the thermal loss and safety of animals and the safety of personnel.

Helicopter

The use of equipment, such as the Anderson sling, designed for helicopter lifting of animals from remote or inaccessible emergency situations.

Identifying Skills Deficiencies

The Establishment and Running of Large Animal Rescue Teams

Management of Personnel, Equipment and Operations

Agencies involved in emergency response such as police, fire fighters, ambulance officers, CFA, SES, defence personnel, animal control officers, rangers, veterinarians, animal owners, animal transport drivers and members of the public can potentially all be involved in a large animal emergency.

The establishment of a protocol for a rescue team would maximise efficient and safe rescue operations. The roles and responsibilities of the team members would be identified and known. Safe working procedures, teamwork, good communication skills and common values/goals would be established. These skills are particularly important in hazardous situations, and during night operations.

An emergency response team could be modelled on the Hagyard Medical Equine Medical Institute in Lexington, Kentucky, which has a fully functioning equine ambulance with trained staff available 24 hours a day, 7 days a week. The objectives of the Hagyard Equine Medical Institute's emergency response team are as follows:

- Provide a safe, clean ambulance for transporting critical patients between veterinary facilities with:
 - on-site technicians who can help assist with transportation
 - on-site driver
- Provide the community with a state-of-the-art ambulance for their horses, when needed with:
 - specially trained personnel
 - specialised equipment
- Raise awareness and the level of care for horses in critical situations by providing a well known, state-of-the-art training program for veterinarians, emergency workers and lay people around the world.

Equipment management includes coordinating the supply of equipment, checking and maintaining equipment in good working order, cleaning and decontamination and repair of equipment. Equipment includes rescue equipment, machinery, generators, lights, animal first aid supplies, and personal protective equipment.

The Establishment and Operation of Large Animal Rescue Ambulances

Establishing dedicated large animal/equine ambulances, the primary function of which is to rescue and save animals in emergency situations, rather than to just remove the animal from the general public's view in times of an emergency.

This includes the types of equipment used and the management of personnel, equipment and operations. The ambulance needs to be equipped with rescue equipment, first aid treatment supplies and a hydraulic winch for pulling animals into the ambulance for transportation to veterinary hospital.

Animal Decontamination Techniques

Specialised techniques for dealing with animals contaminated with hazardous or non-hazardous substances in chemical spills, and the decontamination of animals contaminated with dangerous substances and infectious pathogens, such as found in floodwaters.

The International Experience

Whilst researching Large Animal Emergency Rescue the Fellows learned that there were various groups offering training in the USA, but only one group in the UK. By liaising with the TLAER organisation in the USA and the BEVA in the UK, the Fellows were able to attend both of their training programs.

Once these major dates were selected the Fellows were able to schedule other associated visits with organisations that could offer information and support to our knowledge development.

Rescue and Emergency Medicine Training for Equine Vets

Joint BEVA and Hampshire Fire and Rescue Services (HFRS)

Venue: Lyndhurst Fire Station, New Forest, Hampshire

Date: 24th and 25th March 2009

Sponsors: Direct Medical Supplies Ltd and Dechra Veterinary Products Ltd

Course Description

This course is designed to provide rescue and emergency training to enable delegates to work effectively with the emergency services in equine rescue and to provide emergency care of rescued horses. This course is provided through the partnership between BEVA and HFRS. It is suitable for all veterinary surgeons who work with horses, especially those from practices in the Emergency Services Protocol Directory of Equine Veterinary Surgeons.

Day one of the course, led by HFRS, covers rescue techniques and is a mixture of seminars and hands-on practical sessions where delegates will learn rescue techniques using a life-sized anatomical horse manikin in simulated, but life-like, rescue situations.

Day two is led by equine clinicians who are skilled in emergency medicine, and is a mixture of seminars, case-based discussion and hands-on practical sessions designed to cover the practical aspects of veterinary care in emergency situations.

Course Objectives

- Feel confident to respond and participate in equine rescues.
- Understand the role of the veterinary surgeon when attending equine rescue incidents and how the veterinary surgeon interacts with the fire and rescue service and other emergency services.
- Understand the techniques used by the HFRS to rescue horses involved in road accidents and other incidents, including stuck in rivers, ditches and cattle grids.
- Be able to work safely and effectively to assist the HFRS in equine rescue, including provision of appropriate sedation, analgesics or anaesthesia.
- Be able to deal with the emergency medical and surgical care of horses that have been rescued.

The International Experience

Speakers

- Jim Green, Animal Rescue Specialist (from HFRS), trained as a forest manager and experienced various aspects of forestry both in the private and public sector before moving to Australia for a season as a first attack forest fire fighter with the Forestry Commission. Since joining HFRS Green has utilised his forestry and farming skills to develop the Service's Rural Safety and Animal Rescue Teams.
- Anton Phillips, Animal Rescue Specialist (from HFRS), is a watch manager at Eastleigh fire station and is an animal rescue specialist. Having a strong agricultural and equine background, he became the catalyst to develop a specialist Animal Rescue Team in Hampshire. Anton has spent many years studying animal psychology and physiology, which has enabled the fire and rescue service to achieve safer working practices.
- Imogen Johns, BVSc DipECVIM MRCVS (BEVA representative)
- Andrew Harrison, BVSc CertEP CertVA MRCVS (BEVA representative)

Program

| Day One: Rescue Techniques | |
|-----------------------------------|---|
| 09:00 | Registration and coffee |
| 09:30 | Seminars and problem solving: <ul style="list-style-type: none"> • Rescue scenarios: problem solving and decision making (small group discussion). • Incident Command System (ICS): How the emergency services work at incidents, the role of the veterinarian at incidents and the relationship between the emergency services and veterinarians (seminar). • Safe working at incidents: safety and danger zones, safety procedures, personal protective equipment (PPE) for working safely at incidents (seminar). • Rescue techniques: planning rescues, methods of rescue including use of strops, mud lance, restraining hobbles, lifting slings, rescue glides (seminar). |
| 12:30 | Lunch |
| 13:30 | Practical Sessions (delegates work with HFRS officers and conduct simulated rescues using a life-size anatomically correct horse manikin): <ul style="list-style-type: none"> • Manual and mechanical skidding techniques. • Lifting for rescue on medical suspension. • Use of the Cornwall Mud Lance. • Use of Rescue Glide. • Use of Rescue paths. • Use of Trailer righting. • Use of 'A' frame lifting. |
| 17:00 | Rescue scenarios: problem solving and decision making (small group discussion), questions and answers, summing up of key points for day one. |

The International Experience

| Day Two: Emergency Medicine and Surgery | |
|--|---|
| 08:30 | Chemical restraint: <ul style="list-style-type: none"> • Sedation, analgesics and field anaesthesia: decision-making techniques, how, where, when, why, working effectively with the Fire Rescue Services and the veterinarian's role. • Equipment: remote injection techniques and what to put in your rescue kit. |
| 10:00 | Coffee (delegates to be divided into three groups of five for three practical sessions) |
| 10:30 | Practical Session One: <p>Group 1: Practical rescue scenarios (bog rescues using 'Lucky' the horse manikin)</p> <p>Group 2: Rescue scenarios (delegates reconsider the scenarios given to them briefly at the start of day one).</p> <p>Group 3: Case based clinical problem solving (This session uses images of horses after actual rescues to ask 'what are you going to do now?' The session will cover assessing and managing the recumbent horse; fluid therapy – fluid choices, administration, catheters; assessing and managing hypothermia; preventing and treating sepsis in horses after rescues and trauma).</p> |
| 12:15 | Lunch |
| 12:45 | Practical Session Two: <p>Group 1: Case based clinical problem solving</p> <p>Group 2: Practical rescue scenarios</p> <p>Group 3: Rescue scenarios</p> |
| 14:30 | Practical Session Three: <p>Group 1: Rescue scenarios</p> <p>Group 2: Case based clinical problem solving</p> <p>Group 3: Practical rescue scenarios</p> |
| 16:15 | Coffee |
| 16:30 | Final question and answer session |

Course Outcomes

DAY ONE

General Background

- Definition of animal rescue is *"the removal of an animal from place of danger to a place of safety by the most humane method, with overriding regard for the safety and welfare of ourselves and members of the public."*

Source: Green, J., *Rescue and Emergency Medicine Training for Equine Vets* (course notes), BEVA and Hampshire Fire and Rescue Service, 24-25 March, 2009.

The International Experience



2009 BEVA/Lyndhurst Rescue and Emergency Medicine Training for Equine Veterinarians



Anton Phillips (HFRS) explaining rescue equipment layout and usage



The quick release winch adapted from yachting use



Use of crook and reach technique



Use of strop guide to thread strop under horse mannequin



Use of crook and rescue glide for package and transport of injured horse

The International Experience



Multi-role vehicle (MRV) showing crane and rescue cranes



Demonstration of trench rescue techniques



Demonstration of mire rescue, using inflatable rescue paths

- The rescue should be of the lowest technical method possible in a quick time frame.
- Large animals can be commercial animals or companion animals with large sentimental value.
- In 2007, 20 per cent of UK Fire and Rescue Services (FRS) had an animal rescue team, but only half of them had specialised equipment, and only a small minority had training in its correct use.
- On average there is one animal rescue per week, per fire station. There are 56 separate fire stations. Lyndhurst FRS does many more, particularly with New Forest ponies. New Forest ponies are not feral, but are owned by local people with grazing rights to the New Forest who pay a fee each year for each animal turned out. The breed was first recorded in existence in 1016. The New Forest National Park is 140,000 acres with Lyndhurst the 'capital'.
- Media like to profile and cover animal rescues and this can be a double-edged sword. As many people often stop to watch it can be hard to manage the incident, and unrestricted mobile phone video footage can be misinterpreted. But it is a great way to raise awareness and donations for large animal emergency rescue activities if handled correctly and if the rescue is performed in a professional manner.

The International Experience

This is especially true with increased recognition of public safety, rescue personnel safety, animal welfare and economics of the livestock and pet industry:

- A £3.4 billion horse industry (gross output).
- The horse industry employs 50,000 people directly. It employs an additional 100,000 -200,000 people indirectly.
- 2.4 million people ride.
- 5 million people have an active interest in the horse industry.
- 11 million people have some interest in the industry, including watching horse racing on television.
- There are between 600,000 and 1 million horses.

Source: Lantra, The Sector Skills Council for the environmental and land-based sector, *Sector Skills Agreement Equine Industry Annex February 2007*, UK, viewed 3rd July, 2009, <http://www.lantra.co.uk/EasySiteWeb/GatewayLink.aspx?alld=5976>

- In 2007 animal rescue specialists completed 70 per cent of 164 rescues with an RSPCA Officer. The result is an annual efficiency saving of 900 firefighter and 320 manager hours for the FRS.

Emergency Protocol

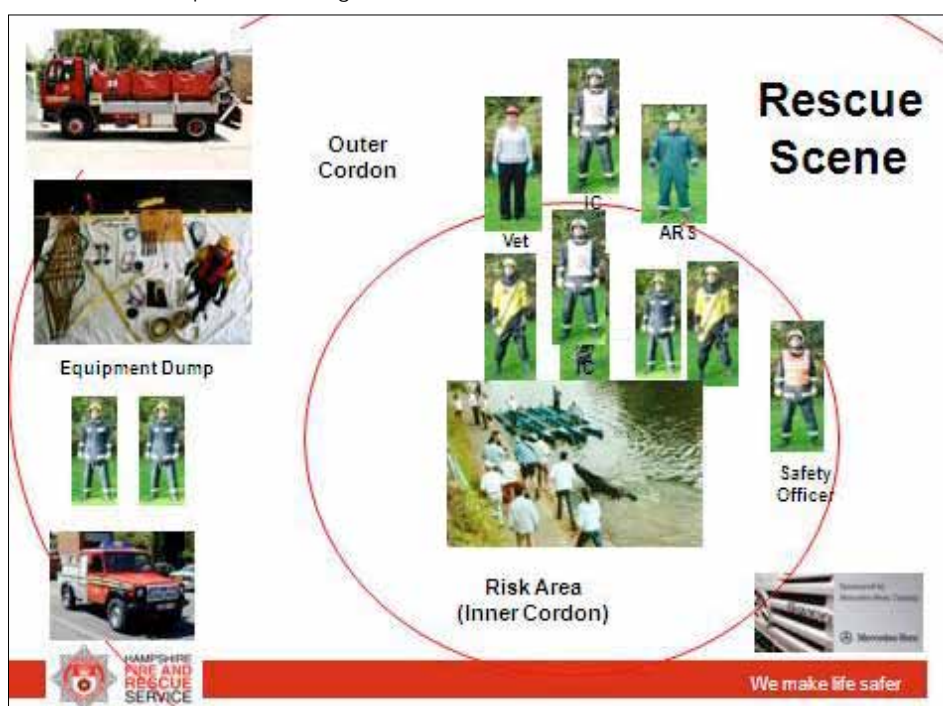
- In 2007 there was a media call to standardise and create a national protocol. This was developed, along with a national register of participating veterinary practices. The protocol includes Standard Operating Procedures (SOPs), and standard questions to be asked by emergency telephone operators in the central control room. The protocol was developed by a number of stakeholders in addition to the FRS and BEVA.
- BEVA has set up a fund which pays for:
 - training
 - awareness programs
 - veterinarian costs incurred at a large animal rescue (if owner of animal is not identified).

Safety

- The aims of the HFRS are to respond to dangerous situations to keep people safe and healthy. Traditionally the HFRS was not explicitly aware that animal rescues are hazardous to human life and so were not trained, as this was not part of their job description.
- HFRS people do not know about animal behaviour, husbandry or restraint. It has been noted that all large animals pose a threat to human life.
- Persons involved in an large animal rescue include:
 - owner and handler
 - general public
 - HFRS: incident commander / safety officer / general officers
 - veterinarian
 - additional support, such as heavy machinery or specialised equipment sourced to be used during the rescue.
- It is not usual for this mix of people to work together in a harmonious way with a level of understanding of each other's strengths and roles in a rescue situation.

The International Experience

- As the aim of the training is to get a cohesive team from this mix of people, to keep everyone safe and ensure a viable animal rescue, it is strongly recommended that all rescues are kept as simple as possible.
- There must be an inner and outer cordoned zone around the rescue to prevent injury to non-essential persons during the rescue.



Source: Green, J., *Rescue and Emergency Medicine Training for Equine Vets* (course notes), BEVA and Hampshire Fire and Rescue Service, 24-25 March, 2009.

Equipment

- Whilst much of the equipment used and demonstrated to us is from their standard fire engine set up, there has also been development of specialised equipment. This equipment was laid out, identified and the uses explained.
- Some equipment was custom made to HRFS specifications by a local engineering company. Whether the same equipment can be used here by government bodies such as fire, SES, will need to be investigated:
 - strop guides
 - mud lances
 - crooks
 - strops
- Other equipment added to the rescue unit:
 - pig boards
 - head collars and leads
 - hobbles
 - rescue paths
 - yachting release

The International Experience

- PPE was emphasised throughout the course and it was mandated that all participants wear a helmet and steel-capped boots when undertaking an activity.
 - Dry suits and lifejackets (for the protection of personnel working around water, should the incident be water related). Where crews are dealing with mud they will still tend to wear the dry suit, as it is easier to clean and disinfect post-incident.
 - Padded vest and gauntlets.
- Two mannequin horses were used. One has moveable joints similar to a live horse and is a reasonable weight suitable for training. This mannequin was developed by Rescue Critters of California and stands 15 hands high. The second mannequin was made in Wales and has fixable joints so that it can stand up or be movable. It is made from a lot heavier material and so closer to a real horse's weight.
- Any equipment sourced from 'outside' people such as local farmers, must be used with extreme caution as the maintenance history and safety is unknown. This point is especially relevant with farm machinery as in many cases it is not well maintained and often used outside of the original manufacturer's specifications.
- Large equipment used throughout the training course included:
 - a two horse float (old condition)
 - tractor (to assist in roll over scenarios)
 - a multi-role vehicle (MRV) this is the primary rescue resource and is equipped with four-wheel drive, hiab crane and winches.

Techniques Shown

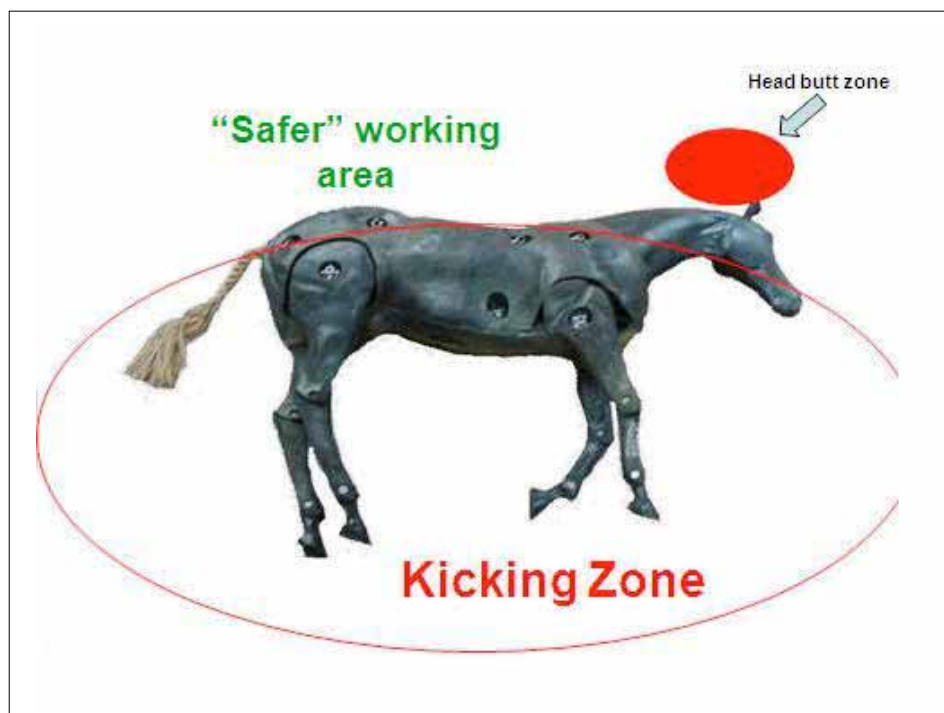
- forward, backwards and sideways assist
- forward assist (standing)
- roll over (outdoors and confined space)
- rescue sling and suspension hoist
- hobble lift
- rescue glide
- trailer extraction
- trailer righting.

These techniques were practised on the mannequins in an obstacle course and ditch extraction.

Rescue Organisation Points to be Noted

- Always have a planned escape route
- Stay out of the 'danger' (kicking and head butt) zone (red – see following diagram).

The International Experience



Source: Green, J., *Rescue and Emergency Medicine Training for Equine Vets* (course notes), BEVA and Hampshire Fire and Rescue Service, 24–25 March, 2009.

- Have a veterinarian sedate the horse prior to starting the rescue.
- Always control the head.
- Minimise stimulation by ensuring:
 - All rescue vehicles approach with lights, but no siren.
 - Sight, sound, touch and smell are all considered.
 - Many fire uniforms may be smoke tainted that can upset the horses.
 - Cotton wool is used in the ears to reduce sound
 - Eyes are covered (pacifiers, bra, etc).
 - Personnel movement is kept to a minimum. Consider the plan and all actions prior to starting.
- Remove the owner/handler as they often increase the horse's fear level and adversely stimulate the horse due to their emotional and often irrational behaviour.

DAY TWO

Veterinary Information

- Sedation and anaesthesia was covered by Andrew Harrison. Feedback and interaction with the group was actively encouraged to maximise their previous experience and to learn from one another.
- This technique was beneficial on another level as it fostered team cohesiveness which many veterinarians lack as they often work on their own.

The International Experience

- Many interesting points were covered regarding drug type, delivery method and amounts.
- Fluid therapy was covered as many animals experience fluid loss and die due to shock not injuries.

Scenarios

- Scenarios that had been presented on day one as the starting point were revisited, to be analysed and identify improvements to how they would have been dealt with previously, how they were dealt with, and what could be done in the future.
- All rescues are photographed/recorded so that HFRS can learn and improve each time.
 - The culture of the HFRS was of complete openness and willingness to admit error and learn from their mistakes.
 - The HFRS used members of the public to record as it gave them a job to do and makes them feel useful.
 - The HFRS debrief after every rescue.

Practical Scenario

The mannequin horse was partially submerged in the New Forest mire with a 'rider' trapped beneath.

- HFRS had an extra crew to assist in splitting the group into three to maximise hands on training.
- Incident command as well as the rescue techniques was practised.
- Dry suits, life jackets and full PPE were used, as the mire was bottomless in places and care needed to be taken.
- Inflatable rescue platforms were used to allow safe access across the mire and into the 'safety' zone next to the horse.
- As the horse was a mannequin many of the veterinarians did not give enough respect to the 'kill' zone or the animal's welfare. Whilst many tried to treat the horse as real, it is impossible to simulate the adrenaline rush and the automatic reactions in dealings with actual horses.

Post Rescue First Aid in the Field

- Presented by Imogen Bailey.
- This covered basic triage and first aid for the veterinarian when first on scene:
 - physical examination
 - analgesics/sedation
 - shock treatment
 - inflammation treatment
 - sepsis
 - euthanasia
 - fluid therapy
 - non-steroidal anti-inflammatory drugs (NSAIDS)
 - antibiotics.
- Three scenarios were presented and then discussed for best triage and first aid.

The International Experience

Overall Training

- Three tiered approach:
 - Level 1—Awareness (2 hours)
 - Level 2—Technical (3 days)—teaching techniques to fire fighters
 - Level 3—Advanced (for instructors)
- Personnel involved in animal rescues need to be trained in animal behaviour and handling. This is done locally and covers a range of animals (pigs, cattle, horses, and sheep). It includes capture and restraint.
- HFRS personnel also trained in trench rescue and mud/swift water rescue.
- The veterinarian course is designed to get the veterinarian to:
 - adopt safe work practices
 - form part of the cohesive HFRS response team.
 - Accept that they will be an advisor not the incident commander on scene.
 - The veterinarians have been taught to take control in any situation and were under the understanding that they could be held liable for any injury to human or animal at a rescue scene. This is why many veterinarian practices will not attend a rescue scene.
- The HFRS is working hard to get consistency across all of its teams.
- They are working with senior HFRS personnel to have animal rescue training standardised for the UK and included as a normal part of fire fighter training.
- Hampshire Fire and Rescue Service—animal rescue statistics.
 - Details of the number of calls to incidents involving animals that HFRS has attended from 2004 are given below:

| Month | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 |
|-----------|------|------|------|------|------|------|
| January | 22 | 10 | 8 | 14 | 24 | 5 |
| February | 11 | 13 | 13 | 11 | 12 | 5 |
| March | 12 | 6 | 10 | 7 | 13 | 10 |
| April | 13 | 11 | 27 | 12 | 13 | 4 |
| May | 15 | 18 | 10 | 7 | 21 | 27 |
| June | | 17 | 13 | 14 | 18 | 17 |
| July | | 15 | 11 | 12 | 9 | 10 |
| August | | 13 | 13 | 14 | 15 | 16 |
| September | | 15 | 8 | 8 | 8 | 7 |
| October | | 17 | 9 | 10 | 10 | 20 |
| November | | 13 | 16 | 9 | 11 | 8 |
| December | | 10 | 16 | 15 | 6 | 12 |

Note: The Hampshire Fire and Rescue Services respond to approximately 25,000 incidents a year. **Source:** Hampshire Fire and Rescue Service, *Specialist Response – Animal Rescue Statistics*, viewed 3rd July, 2009, <http://www.hantsfire.gov.uk/theservice/sp-and-sr/specialistresponse/specialistrescues/animalrescue/animalrescuestats.htm>

The International Experience

- Green and Phillips have recognised the need for training of horse owners, farmers, and racing officials in the awareness of animal rescue services and techniques. They are currently writing Standard Operating Procedures (SOPs) and are willing to share these resources.

NC SART and NC DACS Meeting

Meeting with Chester Lowder, Executive Director of North Carolina (NC) State Animal Response Team (SART) and Sharron Stewart, Director of Emergency Programs Division, North Carolina Department of Agriculture and Consumer Services (DACs)

Chester Lowder is the Executive Director of the NC SART as well as the Director of Livestock Program, Public Policy Division, North Carolina Farm Bureau Federation, Incorporated, Raleigh, NC.

Sharron Stewart is the Deputy Director for the Emergency Programs Division and a Liaison to the Assistant Commissioner for Consumer Protection of the North Carolina Department of Agriculture and Consumer Services. As a member of the State Emergency Response Team (SERT), Sharron has been activated on numerous occasions for various events/incidents since 1996. She has been active with SART since 2000.

Sharron received the 2003 NC SART Leadership Award and the 2004 SART Appreciation Award for her management of the Logistics Section, responsible for supporting all members and volunteers with communications, food and shelter, equipment, transportation and security. Sharron graduated in 1981 from NC State University. She became a Certified Public Manager in 1999.

In 2005, Sharron graduated from UNC-Chapel Hill School of Public Health Community Preparedness and Disaster Management (CPDM) Masters' Certificate Program. In 2005, she also responded as the Logistics Chief to the Hurricane Katrina event as part of North Carolina's Animal Response Incident Management Team to Mississippi.

In response to disasters involving human, animal and agricultural losses various states in North America have formed State Animal Response Teams (SART). These teams are linked to the Federal Emergency Management Agency (FEMA). Across the United States, 21 states have a SART and a further five states are developing their own. Most of these states are in the Eastern, Southern or Mid-west regions of the United States.

In North Carolina they can experience:

- tornados
- hurricanes
- ice storms
- flooding
- severe storms/winds
- blizzards.

The SART was founded in North Carolina after hurricane Floyd, during which more than three million domestic and farm animals were lost. Many could have been saved by a coordinated emergency response plan.

The US Department of Agriculture, through the Farm Service Agency, has provided payments and loans of \$93.5 million to help North Carolina farmers recover from hurricane Floyd.

The International Experience

Major Disaster Declarations in North Carolina

| Year | Date | Disaster types |
|------|-------|---------------------------|
| 2008 | 10/08 | Tropical Storm Hanna |
| 2005 | 10/07 | Hurricane Ophelia |
| 2004 | 09/18 | Hurricane Ivan |
| 2004 | 09/10 | Tropical Storm Frances |
| 2003 | 09/18 | Hurricane Isabel |
| 2003 | 03/27 | Ice Storm |
| 2002 | 12/12 | Severe Ice Storm |
| 2000 | 01/31 | Winter Storm |
| 1999 | 09/16 | Hurricane Floyd and Irene |

Source: Federal Emergency Management Agency, *North Carolina Disaster History*, viewed 27th February 2009, http://www.fema.gov/news/disasters_state.fema?id=37

SARTs are inter-agency state organisations dedicated to preparing, planning, responding and recovering during animal emergencies in the United States. This involves a coordinated effort of over 30 government and animal organisations.

Each SART is a public/private partnership, joining government agencies with private concerns around the common goal of animal issues during disasters. SART programs train participants to facilitate a safe, environmentally sound and efficient response to animal emergencies at the local, county, state and federal level.

The teams are organised under the auspices of state and local emergency management utilising the principles of the Incident Command System (ICS) developed by the FEMA.

Using ICS as a set of core principles, SART develops units of addressing all aspects of disaster response. Each SART has four sections:

1. logistics
2. operations
3. planning
4. finance/administration.

The SART structure is organised at the grassroots level with County Animal Response Teams (CART). CARTs are under the jurisdiction of specific county emergency management, and include animal control officers, cooperative community extension, sheriff's department personnel, veterinarians, forestry officers, animal industry leaders and concerned citizens.

The ICS has been recognised by the Department of Homeland Security as the most effective system for managing emergencies. This system has been universally adopted as part of the National Emergency Response System (NERS).

The North Carolina SART works in conjunction with the Emergency Programs Division, North Carolina Department of Agriculture and Consumer Services.

The International Experience

The North Carolina Department of Agriculture and Consumer Services (NCDA&CS) divisions have responsibilities in regulatory and service areas covering:

- agronomy
- animal health
- weights and measures
- gas and oil inspection
- crop and livestock statistics
- United States Department of Agriculture (USDA) commodity distribution
- state farm operations
- food, drug and cosmetic testing for purity
- agricultural marketing and promotion
- agricultural marketing grading
- international agricultural crop and livestock marketing
- operation of the North Carolina State Fair and North Carolina Mountain State Fair
- operation of five state farmers markets
- research station operations
- seed and fertiliser inspection
- nursery and plant pest eradication activities
- regulation of the structural pest control industry
- agricultural environmental issues
- state and federal agricultural legislation
- agricultural economic analysis.

The NCDA&CS Emergency Programs Division mission is to reduce the vulnerability, or the impact of any disaster, disease or terrorist attack on the agriculture community of North Carolina. The Emergency Programs Division provides leadership within the agricultural community for emergency preparedness and response. The Emergency Programs Division establishes public-private partnerships between vital government agencies, industry and volunteers to ensure forward progress on emergency related issues.

The primary focus of the Emergency Programs Division has shifted over time from one of disaster response and recovery to disaster mitigation. It is hoped that through disaster mitigation the cost of recovery and economic impact can be reduced.

In North Carolina the mitigation plan also includes:

- advanced warnings being used to identify animals to be sent to the slaughter houses early, so that there is no disruption to the food chain caused by pollution, nor as many animals to be involved in the disaster rescues
- building of more disaster proof housing and protection of assets to minimise damage.

One of the hardest lessons learned from hurricane Floyd was the need to consider very carefully the release of livestock in the face of a disaster (for example flooding). Housed animals such as pigs and poultry are not familiar with the outside environment when released, and have no access to feed or clean water. Thousands of livestock were drowned or died as a result of exposure, starvation or disease and contaminated the state waterways.

The International Experience

It was an expensive clean up and a hard lesson to learn. Policy has changed as a result, with the recommendation that if the animal cannot be evacuated it is not to be released. All livestock producers (poultry, swine and dairy) must have emergency generators and an emergency plan.

At the local county level the CART focus is to protect:

- wild and domesticated animal resources
- public health
- public food supply
- environment
- humane care and treatment of animals in case of a large-scale emergency.

Emergencies include hurricanes, tornadoes, floods and wind-driven water, drought, fire, explosion, building collapse, commercial transportation accidents, chemical spills, nuclear power plant accidents, foreign animal disease outbreaks, incidents of bio-terrorism, or other situations that cause animal suffering.

The CART works in with such agencies as:

- County Emergency Operations Centre
- County Public Health Department/Animal Control
- County Cooperative Extension Service
- County Public Health Department/Environmental Health
- County Rescue
- Volunteer Fire Department/Rescue Squad
- American Red Cross
- Private Boarding Kennels
- Chatham County Veterinary Clinics
- Chatham County Sheriff's Department
- North Carolina Veterinary Medical Association
- Veterinary Medical Assistance Teams (VMAT)
- Humane Society of the United States
- American Humane Association
- North Carolina Wildlife Resource Commission
- North Carolina State Animal Response Team.

The CART responds in two primary ways:

1. search and rescue
2. sheltering.

To assist in these areas the North Carolina SART has developed a Companion Animal Mobile Equipment Trailer (CAMET). Mobile equipment to meet the requirements of the Pets Evacuation and Transportation Standards Act of 2006. Provides the necessary mobile infrastructure, technical support and standardised forms for collocation sheltering.

The International Experience



Chester Lowder with the CAMET



Interior of CAMET unit

The CAMET benefits are:

- immediately deployable
- meets Emergency Management Assistance Compact (EMAC) guidelines
- high visibility
- multi-use
- easy inventory
- self powered.

The CAMET contains:

- 45 x large folding cages/crates (48" X 30" X 36")
- 15 x medium folding cages/crates (30" X 19" X 22")
- 5 kW generator
- 2 x first aid kits
- pressure washer
- shop vacuum
- 6mm sheet plastic
- 50' water hose
- 3 x 50' power cords
- 200 x polypropylene envelopes (8.5x11 feet) for cages
- 250 x animal intake registration forms
- 1,250 x tab band collars for animal identification
- 1,250 x coloured wrist bands for owner identification
- 5 x registration log books
- Polaroid camera and 10 film cassettes
- 1,000 x cable ties for envelopes on animal cages
- 2 x flashlight
- 3 x plastic sheets (100x16 or 20 feet wide) to line walls

The International Experience

- Corrugated mat (100 foot) rolls for centre aisle
- 6 x rolls painter's tape for plastic on walls
- 200 pairs of disposable rubber gloves
- 5 x buckets
- 5 x scrub brushes
- 5 x pooper scoopers
- 2 x trash containers
- 50 x garbage bags
- 5 x boxes of plastic bags for faeces pick up
- hand washing station
- 1 x quaternary disinfectant bottle
- 1 x bleach bottle
- 2 x spray bottles for cleaning cages/crates
- 5 x litter boxes
- 5 x Litter scoops
- 100 lbs of cat litter
- orange cone for inside walking area
- 50 x bowls
- 2 x spoons/measuring cups to scoop food
- 2 x can openers
- hose to clean walking area (50 feet)
- mop
- mop bucket with wringer
- 2 x pair jack stands
- animal control pole
- 2 x handling gloves
- gas (petrol) can for generator
- 2 x telescoping work lights
- first aid kit (for volunteers and pets).

Source: North Carolina State Animal Response Team, CAMET by NC SART, viewed 27th February 2009, <http://nc.sartusa.org/resources/pdf/sart-camet-083007.pdf>

The CAMET can use the equipment to rescue animals and turn human facilities into animal shelters. For example the plastic floor covering to protect against damage and for hygienic purposes. Many other USA state CARTs are purchasing a CAMET from North Carolina SART.

The International Experience

NC SART and NC State University Meeting

Meeting with Chester Lowder, Executive Director of North Carolina State Animal Response Team (SART) and Dr Richard A. Mansmann, Director of Podiatry and Rehabilitation Service at North Carolina State University

Dr Richard Mansmann, equine veterinarian, is one of the founding leaders of large animal emergency rescue training, with the first conference held in 1993. This International Conference on Equine Rescue was held in Santa Barbara, California.

Dr Mansmann works closely with the North Carolina SART and is also a published author of many articles and books relating to horse health (in particular podiatry and rehabilitation services).

The process involved in setting up a CART was discussed. Horse owners, horse clubs, emergency personnel, Local Government agencies and volunteer organisations need to be involved. A smooth process is more likely if there are people with a strong interest in horses working within the group.

A major issue in all rescue and disaster situations is the need for animal owners to be responsible for enacting a predetermined disaster plan and/or being familiar with their local CART or large animal rescue organisation. More and more large animal rescue organisations are occurring across the United States with many government agencies having a rescue unit.

Owners need to think about:

- How will they respond?
- What are the time lines on movement?
- What is to be given priority?
- Where can they move the animals?
- Which agency will they need to work with?
- What roads are closed?
- What are the safety issues?

It was also noted that in some instances the livestock had not been handled, or become used to being transported, which severely hampers a rescue or evacuation attempt.

Evacuation points have been pre-designated and are part of the SART emergency rescue plans. These points include fairgrounds with equine facilities and large stadiums.

Technical Large Animal Emergency Rescue (TLAER)

Training course conducted at Eastern Kentucky University

TLAER conducts various training courses across the United States at varying levels of expertise and knowledge:

- **Awareness:** The awareness level TLAER training is an intensive 14-hour course featuring lecture, power point visuals, and student interaction. The practical session only provides demonstrations. This is a minimal hands-on course. It is intended for a general audience. Anyone that needs to understand the overall picture of TLAER is also able to attend.

The International Experience

- **Operational:** The operational level TLAER training is a three-day (26-hour) course. This consists of practical experiences and emphasises the use of the ICS. The course is intended for a specialised audience (CART/SART members, large animal owners/groups, operational personnel in the emergency services, veterinary staff, animal control officers and specialty rescue teams such as Urban Search and Rescue (USAR), etc) and anyone that needs to understand the specifics of TLAER and will expect to complete live rescues.
- **Technician:** Technician level training is available through TLAER.ORG with intense coordination from the primary Instructors.

Howlett and Turnbull attended the operational level TLAER course at the Eastern Kentucky University, hosted by the Safety, Security and Emergency Management department of the university, and sponsored by US Rider.

US Rider is a nationwide roadside assistance motor plan organisation. Not only does it provide the 'normal' roadside assistance, it also provides assistance with veterinary services, stable accommodation, farrier services and safe movement of horse/s.

Currently in Australia there is no equivalent organisation. Australian roadside assistance organisations will not even tow a trailer with animals inside.

Course Description

The three-and-a-half-day course comprises of two main parts—theory and practical. All days start with theory, which is then built upon during the practical session in the afternoon.

Theory instruction covers the foundation principles of all methodologies, techniques and procedures that are considered to reside within the 'inventory' of modern tactics for response to the various types of TLAER rescue incidents including:

- heavy animals
- confined space
- fire
- hazardous materials (hazmat)
- swift and floodwater
- unstable ground
- sling loading operations for large animal
- vehicle extrication rescues.

ICS and the personnel that typically will respond (along with their duties and roles) are discussed, with special attention to evacuation planning, disaster prevention, animal containment, and field euthanasia scenarios. Additionally, a strong background is provided in the areas of large animal behaviour in normal and rescue circumstances, critical medical issues encountered, and stress responses.

Practical (hands-on) application is intensive and the instruction emphasis is on rescue scene management regarding animal behaviour, roles of responders, use of containment and basic to advanced manipulation methods.

- Live animals are used for simple to difficult realistic demonstrations, and students perform these procedures and techniques with supervision from an instructor, covering basic to advanced handling skills.

The International Experience

- The use of live, trained large animals for the more difficult demonstrations (vertical lifts, recumbent animals, trapped etc) and hands-on rope/mechanical advantage work is a feature of this course.
- A realistically weighted mannequin may be used in selected training scenarios to reduce the chance of injury to students and to demonstration animals (for example based on environmental factors).

The course has been designed to train those people (majority of participants are fire, police, paramedics, dedicated rescue workers) expected to participate and conduct large animal emergency rescues and to work effectively using the core skills that they have learnt through their primary training. Primary training covers skills such as:

- Incident Command System
- Basic knots, ropes and pulleys
- First aid.

Course Objectives

The course aims to improve the standard of care for large animal victims while improving the safety margin for emergency personnel responding to incidents. Learning of rescue methods that emphasise the use of simple techniques and tools where possible, and the philosophy of the training is to complement the Incident Command System (ICS) training and operations at all times.

Instructors

- Dr Tomas Gimenez, Medical Veterinarian, is a Professor emeritus at Clemson University, South Carolina. Founding member of the Department of Homeland Security and a member of the National Disaster Medical System/National Veterinary Response Teams, and the American Association of Equine Practitioners. Dr Tomas Gimenez has been training people in these techniques since 1997 and is the author in 2008 of the first book in this field.
- Dr Rebecca Gimenez, Ph.D. Animal Physiology, is a major in the US Army Signal Corps and has worked as an adjunct faculty member at Anderson College South Carolina. Rebecca has trained the live demonstrator animals used during the training and has been training people in TLAER techniques for the last ten years. Founding member of the Department of Homeland Security and a member of the National Disaster Medical System/Veterinary Assistance Teams, Veterinary Emergency, Critical Care Society and an Advisory Board member of the South Carolina Awareness and Rescue for Equines.

The International Experience

Program

| Day One: March 31 2009 | |
|-------------------------------|---|
| 8:00–12:00 | <p>Morning classroom session:</p> <ul style="list-style-type: none"> • introduction • review of the senses of the horse under stress • behavioural characteristics of other large animals in stressful environments • cattle, swine, llama, ostrich, emu • approach and equipment for restraint and/or containment • the Incident Command System, purpose and structure in large animal rescue • position, timing, communication • the horse owner • the large animal veterinarian • use of sedatives/tranquillisers in rescue • chemical restraint/capture. |
| 12:00–1:00 | Lunch |
| 1:00–4:00 | <p>Afternoon Practical Session:</p> <ul style="list-style-type: none"> • basics of rescue ropes and knots in large animal rescue • containment of large animals • emergency rope halter • approach and restraint • forward assist • backwards drag • placement of leg ropes/hobbles • cast animals. |
| Day Two: April 1 2009 | |
| 8:00–12:00 | <p>Morning classroom session:</p> <ul style="list-style-type: none"> • the law enforcement officer • legal aspects • humane destruction • trailers, types, configurations and construction. • trailer accidents and rescue • rescue from horse barn fires. |

Continued...

The International Experience

| | |
|--|---|
| 12.00–1.00 | Lunch |
| 1:00–3:00 | Afternoon Practical Session: <ul style="list-style-type: none"> • rope systems Z-Rig, 9:1) • do's and don'ts of winches • trailer up-righting • vertical lift (non-helicopter) • mud rescue. |
| 2-3 hours starting after sunset | Night Search and Rescue Operation |
| Day Three: April 2 2009 | |
| 8:00–12:00 | Morning classroom session: <ul style="list-style-type: none"> • Use of helicopters in large animal rescue. • Large animal water rescue/Equine Flotation Device. • Presentation of actual incidents with class participation. |
| 12.00–1.00 | Lunch |
| 1:00–3:00 | Afternoon Practical Session: <ul style="list-style-type: none"> • mud rescue • airlift rescue. |
| Day Four: April 3 2009 | |
| 7:00–12:00 | Morning Practical session: <ul style="list-style-type: none"> • Large animal Hazmat decontamination demonstration. • Certificates distributed at noon. |

Course Outcomes

General

- Principles of large animal emergency rescue are:
 - Use a low risk, most efficient process.
 - Use the ICS.
 - Always have a safety officer.
 - Wear appropriate protective clothing and equipment.
 - Know the animal's behaviour under stress.
 - Document the incident (pictures/videos).
 - Do not attempt rescue operations that are outside your scope and level of training.
 - Before any action stop and evaluate.
- After the rescue a debrief meeting must occur with all personnel involved:
 - Who was there?
 - What happened (in detail)?
 - Why procedures were selected?

The International Experience

- Time line?
 - What would be done differently next time in a similar situation?
 - What needs to happen in preparation for the next rescue (training, equipment purchase or repair, etc)?
- In 2005 a study found that veterinarians who work with horses were more likely to get injured if they were the owner of a horse.
Source: Jäggin S, Fürst A, Hässig M, Auer J., 'Kick injuries of veterinarians during examination and treatment of horses: a retrospective study in Switzerland.' Schweiz Arch Tierheilkd. 2005 Jul;147(7):289
 - Emergency workers need to rescue animals, because if they don't a member of the public will try to and will potentially get into trouble and risk serious injury or loss of life. The 2004 national survey by the American Animal Hospital Association found that 83 per cent of pet owners said "*they are somewhat to very likely to risk their life for their pets*", 89 per cent believe their pet understands all or some of what they say, and 53 per cent believe their pet would come to their rescue if they were in distress. Also, nearly one-third of those surveyed spend more time with their pet than family or friends. A near majority (48 per cent) consider themselves emotionally dependent on their pet.
Source: American Animal Hospital Association, '2004 Pet Owner Survey', viewed 13th July 2009, <http://www.aahanet.org/media/graphics/petownersurvey2004.pdf>
- A study of livestock accidents in North America has found that fatigue is the major factor in accidents and that 80 per cent involved a single vehicle. Driver error was blamed for 85 per cent of accidents with the majority of causes being vehicle roll over.
- Source:** Alberta Farm Animal Care Association, 2007, An 'Analysis of Commercial Livestock Truck Accidents in Canada and the United States: a report to improve the care of livestock in Transport', viewed 13th July, 2009, <<http://www.afac.ab.ca/annualreports/AFAC07.pdf>> highlights the following issues:
- Incident rescue training principles are the same for any emergency but the difference is that live animals pose a threat to human life. Therefore, it is extremely important to plan and use an ICS.
 - Most injuries/deaths to animals that are rescued occur as a result of the rescue.
 - Untrained personnel (whether they have experience with animals) tend to use the horse's extremities as 'handles' to pull the horse during a rescue situation. The extremities including head, legs and tail are not structurally designed for large amounts of force and are easily damaged.
 - Horses will eat (appearing normal) post-rescue, but may still be in medical distress and at risk of death due to shock, injuries, etc. Hypostatic pneumonia from being recumbent during a rescue attempt will not be apparent immediately after a rescue and so care must extend over a period of time.
 - Emergency telephone operators need to gather the following information:
 - location (detailed and how to access)
 - nature of incident

The International Experience

- number of animals involved
- if the owner is present
- human casualties.

The operator will contact the appropriate services including fire, police and ambulance and a veterinarian (with TLAER training if possible).

- In the event of an accident the first responder should:
 - Check for human occupants.
 - Check for explosive hazards (many horse truck and trailers with living compartment will have propane tanks).
 - Check for animal occupants (always read signage on truck before opening any doors/windows etc).
 - Check for springs on doors (if present need to remove as they are under tension).
- With large incidents (commercial livestock) lots of government agencies/departments are involved which makes it logistic and planning-wise very confusing. It is critical that all involved follow pre-determined protocols especially with scene control and incident management. A public information officer is important to control media, be a liaison and to meet public concerns such as welfare.
- Bio-security concerns with temporary housing/sheltering of livestock after emergency disasters, especially with commercial livestock and the necessity of being able to trace origin of livestock.
- Zoonotic diseases found in Australia range from skin diseases such as ring-worm to deadly parasitic or viral diseases, including the deadly Hendra Virus. There are over 24 zoonotic diseases present in Australia.
- Trauma and stress in large animals (especially horses) can lead to:
 - pressure leading to ischemia
 - pain
 - hypoventilation
 - hyperthermia
 - heat stroke
 - dehydration (note: large animals require very large volumes of intravenous fluids to reverse the effects of dehydration—at least 40 litres)
 - colic
 - shock
 - kidney failure.

Safety

- All emergency personnel need to be trained in different animal behaviour and physiology. As cattle, pigs, emus, alpacas and horses all react differently to human interaction and pose different threats. This is the hardest skill to learn as it can only be learnt over time. Horses and other large animals revert to the wild state very quickly and in any threatening situation will react violently to preserve their own life with no consideration for humans.

The International Experience

- During a rescue people react differently due to the adrenalin in their system, level of experience and knowledge. Therefore, it is critical that the team structure does not break down. Need to maintain:
 - Position—of all personnel on scene and animals.
 - Timing—all movements and efforts need to be coordinated and should not begin until all people and equipment are ready.
 - Communication—everyone should be briefed on what is happening, when and how. Before any procedure the handler must be checked with to ensure that they are ready. When a horse is able to sense ‘freedom’ they will react violently.
- Confined space (animal transport, trench, ditch, etc) rescues are extremely dangerous and people tend to get too close and enter the danger zone. It is important to resist temptation and always perform an external rescue.
- Causes of fires include:
 - faulty wiring
 - smoking (cigarette butts)
 - coffee machine
 - fan heaters
 - solvent and fuel storage (for example treadmills, gurneys)
 - humid hay storage (self combustible)
 - built-in heaters in water troughs (not common in Australia)
 - arson (insurance or wilful negligence).
- It is recommended that heat detectors be used in animal housing and buildings, not commercial smoke detectors as they give a longer response time to fires. A straw box that catches fire has only 30 seconds before it is too late to rescue the horse from being harmed. Straw is commonly used overseas in horse stabling; here in Australia sawdust is more commonly used.

A study published in the *Journal of Dairy Science* included the flammability of common animal bedding materials. The amount of fire damage incurred depends on the quickness with which flames spread and their duration. Shredded paper, although popular for its price, availability, and ease of on-site preparation, is highly flammable and has been the fuel for many accidental farm fires. Wood shavings are slightly harder to ignite (but still easy), but burn longer. Data from the study suggested that pellet-ed newspaper products show the least threat of accidental combustion.

Source: Ward, P.L., Wohlt, J. E., Zajac, P. K. and Cooper, K.R., ‘Chemical and Physical Properties of Processed Newspaper Compared to Wheat Straw and Wood Shavings as Animal Bedding.’ *Journal of Dairy Science*, USA 2000 J Dairy Sci 83:359–367

Another key safety point relating to fires in animal related buildings is that the large roofing dimensions and supporting trusses made of wood make access through roof spaces for fire fighters extremely dangerous and harder to bring a fire under control. Rising heat can cause the trusses to catch on fire and the joints to fail, causing debris to fall under the roof-covered area.

- All emergency responders and animal owners need to learn about animal behaviour during a fire situation. Most believe that if they let doors open the horses will ‘flee’ to safety.

The International Experience

Some horses will, but some due to fear, will stay where they consider to be a 'safe' and familiar spot. Horses will also return into the stable (whilst on fire) if others in their 'herd' are trapped inside, or they will return to their box, which is known to be a 'safe' spot.

- The need for farms and animal related business to have an evacuation plan lodged with the local fire department and advice sought for large scale planning. This helps local authorities to make a coordinated effort in the face of large-scale emergencies where multiple locations may need evacuation and/or assistance.
- Emergency responders are wearing large, cumbersome personal protective equipment which reduces:
 - dexterity
 - flexibility
 - range of movement.

It also increases noise and visual stimulation as many animals have not seen this type of equipment and will view approaching personnel negatively. Emergency personnel need to practice animal handling in their official PPE to appreciate these points.

As demonstrated in the pictures below, on left is usual clothing to which horses are desensitised, where as on right is the unfamiliar hazmat PPE experience.



Comparison of clothing styles and effect on horses *Comparison of clothing styles and effect on horses*

- Veterinarians and police require training in euthanasia techniques for situations where a horse is unable to be rescued or poses a direct threat to human life. Very few are experienced in euthanasia via gun or captive bolt and there are two major challenges to both. An emotional issue and a technical issue. The equine skull is thick bone and the location of the brain is small and not easily accessed. There is also the need to 'back up' the use of the captive bolt, a knife to the chest (pneumothorax) or throat (carotid artery).
- When conducting hazmat operations the safety of those in the specialised PPE must be carefully monitored. Blood pressure should be monitored as it is extremely easy to overheat and suffer varying conditions from dizziness to heart attacks (depending on age, fitness and other associated medical conditions).
- Animals have non-reflective fur so they are very hard to see in the dark and it can be hard when dealing with a situation during the dark.

The International Experience

People responding need to be aware as they approach the scene for loose animals. In rural or remote areas of Australia the incidence of traffic accident involving an animal that results in a fatality is higher than in urban areas. In one study it accounted for 5.5 per cent of crashes, and night-time was a significant factor.

Source: Rowden, P. J. and Steinhardt, D. A. and Sheehan, Mary C. (2008) 'Road crashes involving animals in Australia'. *Accident Analysis and Prevention*, 40(6). pp. 1865–1871, viewed 1st September, 2009, <http://eprints.qut.edu.au/15299/1/15299a.pdf>

- A specialist trench rescue team should be used for any rescue involving animals trapped in a trench, as these rescues are highly dangerous.
- Emergency rescue personnel should have an awareness of the different types of trailer and truck configuration, so that they can make educated rescue attempts without having to enter to find out. Possible configurations include:
 - single float
 - straight 'head to head' (2–15 horses)
 - slant (2–9 horses) with horses on 35°–45°
 - stock (open space—non-secured)
 - gooseneck trailer (2–8 horses)
 - gooseneck with living quarters
 - gooseneck with carriage space
 - semi truck—trailer
 - semi truck—trailer with living space
 - semi truck—trailer with carriage space
 - horse van (need to check for humans).
- The horse van is not common in Australia. It is a light van that has been modified to have side loading ramp.
- All are constructed out of various materials and have different layout of internal doors, partitions, floor, windows, roof, and ventilation.

Equipment

- Any lifting equipment must have a quick release (under weight) to be able to release an animal without getting close. As soon as an animal is lifted they tend to relax and hang limp (if secure). However, as soon as they can touch the ground they will struggle to free themselves, regardless of how injured, quiet or exhausted the animal may appear.
- Approximately 90 per cent of equipment used is common to emergency (fire and rescue) vehicles.
- When selecting lifting equipment, the factors to consider include:
 - all-terrain vehicles (4WD)
 - boom/extendable arm
 - weight capacity
 - need to have minimum three metre clearance between the animal and the vehicle
 - need to consider the 'dead space' above the animal and equipment
 - pulley system.

The International Experience

Tow trucks should not work as lifting equipment as their stabilisation feet do not have the necessary clearance and farm tractors are often poorly maintained and of questionable safety.

- Equine ambulance can be combined with a rescue vehicle, as seen by the TLAER and Hagyard models.
- The HEART equine ambulance attends all major horse events on the east coast of the USA so that it is on standby. Just as there is a paramedic and human ambulance.
- Any webbing used on large animals should be a minimum of 10cm width (note that the English referred to them as strops).
- Most fire hoses are of the appropriate width and can be used as straps used during rescues.
- The importance of correct cleaning and maintenance of gear is emphasised as improper use, storage etc can cause it to fail under pressure.

Technique

- First choice:
 - assistance (forward, backwards and sideways)
 - rescue glide
 - simple vertical lift with 'A' frame
 - use of ropes and pulleys.
- Second choice:
 - mechanical assistance (any machine operated winch must be used with caution as they tend to exert too much force if pulling directly on an animal)
 - helicopter sling/lift.
- What doesn't work:
 - cargo nets
 - rope attached to head, neck, tail or inappropriately to the legs
 - 'home-made' equipment.
- Poly-mesh fencing is to be used as a barrier and to round up stray animals' as it is highly visual, flexible and inexpensive. To aid in use, thin light plastic pipe is attached at point's approximately four metres apart. This allows a minimal number of people to create a herding fence.
- All techniques were demonstrated on a medium sized 'mannequin' horse to show how to apply the technique before practicing on a live demonstrator.
- All participants were involved in the live demonstrator practicals, giving a more realistic simulation. Interestingly, more respect and less confidence was shown by all participants, unlike the practical experience in the UK with a mannequin.
- A handy technique is making temporary halters out of rope that can be used to catch loose horse.
- Always have a perimeter established (fence) before taking any animal out of a vehicle to:
 - Stop animals running out onto the road (not always predictable or tractable).
 - Keep people out (public, owners, etc).

The International Experience

- During flooding animals will seek out the highest ground they can gain access to. It is best if the animal/s are uninjured and at no risk, to leave them where they are and to provide clean water and feed. Map their location using GPS so that they can be recovered when the water recedes.
- The hind and fore quarters of horses will sink, but their chest and abdomen are buoyant and will keep them semi-floated if they are swimming. However, the horse is unable to raise its head sufficiently for long periods and their nostrils are quite low to the water surface level. Hence, they can drown very easily if required to swim for long periods. It should also be noted that the horse does not breathe in a normal manner whilst swimming due to the pressure dynamics of the surrounding fluid, the reduction in the concussion forces normally associated with high speed movement (that requires the equivalent amount of oxygen for muscle use) and the change in body balance means that there is less weight assisting the exhalation process.



Flood rescue demonstration using flotation rescue device



Helicopter lift demonstration using Anderson Sling device

Hagyard Equine Medical Institute Meeting

Meeting with Tara Spach at Hagyard Equine Medical Institute—Emergency Response Team in Lexington, Kentucky (The contact who was originally organised to meet with the Fellows was not available, so Nicole Tomlinson met with the Fellows instead).

Hagyard was founded in 1876 in Lexington, Kentucky, and is at the forefront of equine medicine techniques and research. The practice has various divisions including field care, surgery, fertility centre, laboratory, sport horse, pharmacy and the emergency response team. The institute has approximately 65 veterinarians and 20 veterinary technicians, with three operating suites, six induction areas and sees 6,000 surgical cases a year. The institute also offers Magnetic Resonance Imaging (MRI) and scintigraphy facilities for horses.

The response team is a group of veterinarians and technicians (veterinarian nurses) who are highly skilled in technical rescue techniques. It is a dedicated team who are under the care of Nathan Slovis DVM, ACVIM and are available 24 hours, 7 days a week for the surrounding counties.

The International Experience

The objectives of the team are to:

- Provide a safe, clean ambulance for transporting critical patients with onsite technicians and driver.
- Provide the community with a state-of-the-art ambulance for their horses when needed with specialised equipment and trained personnel.
- Raise awareness and the level of care for horses in critical situations by providing a well-known state-of-the-art training program for veterinarians and lay people.

Meeting Findings and Outcomes

- The ambulance was custom-made in 1995 and has a hydraulic floor that is capable of raising and lowering vertically to provide safe and easy entry/exit for injured large animals (mainly horses). It is equipped with rescue glides, vertical lift equipment, sling, mud rescue, webbing, ropes, medical supplies, winch and a generator to provide power for lights etc. The front section has all of the supplies and seating for a technician to ride in the back to supervise the horse. It is important that no one rides in the animal section, though this is often not practised.
- The ambulance also has a working sink with water, electric lights and portable lights that can be set up around the incident. Also carried in the front section are a fire extinguisher and a tank of oxygen gas for use on horses. The roof is clear Perspex that allows plenty of light during transport without the need for electrical lighting.
- The animal compartment has side air bags that inflate to help stabilise the patient during transport.
- They have teams of one veterinarian and two technicians with an advanced veterinarian who travels to the scene separately. Teams work a 12-hour shift.
- Initial training was conducted by Tomas and Rebecca Gimenez and they now offer refresher training in-house.
- Most neurological cases are slid in/out on the rescue glide and winch. The drop floor is especially useful in these cases. The only drawback of the hydraulic floor is the gaps it creates, which can be very draughty in winter and during transit.
- The towing truck and ambulance are ready at all times for immediate deployment.

Large Animal Rescue Company/Felton Fire Department Meeting

Meeting with John and Deb Fox of Large Animal Rescue Company/Felton Fire Department

John Fox, a primary instructor, is a captain/duty officer with Felton Fire Protection District with 22 years of service. Currently he is a senior investigator/peace officer for the California State Department of Public Health. John established the Felton Fire Department Large Animal Rescue (LAR) Unit that responds throughout central California. He is the primary developer of LAR-Operations, approved by California State Fire Training and Peace Officer Standards Training (POST) and is a California State Fire Instructor.

Deb Fox is also a primary instructor at the Large Animal Rescue Company. She has been an active responder with the Felton Fire Protection District for more than nine years, and is a CA State Fire Instructor. With 12 years of Large animal rescue training experience, she is a lead in the LAR Unit, and has spent many years developing the curriculum for LAR training, applying her understanding of horse behaviour and characteristics to on-scene handling and safety, and was a developer of LAR-Operations.

The International Experience

The group is comprised of fire fighters and horse owners who reside in the Santa Cruz mountains (approximately 560km north of Los Angeles on the coast). The mountain landscape (steep wooded areas and high rainfall) means challenging conditions during animal rescue attempts.

Meeting Findings and Outcomes

- The group mission is not only to provide professional training in LAR rescue techniques, but to also develop new equipment and techniques. The group is also focused on promoting LAR as a standardised response nationwide.
- They started LAR around 1995 after an incident in the forest where a horse rescue by the forestry department was unsuccessful due to poor technique and inappropriate use of equipment (the winch failed), combined with a lack of cooperation with the fire department.
- Through their horse experience and fire training they have developed a certified curriculum for all emergency workers, which also includes assessment. It has been approved by the Statewide Training and Education Advisory Committee and adopted by the State Board of Fire Services.
- John and Deb Fox taught Tomas Gimenez many of the rope systems and techniques that are currently being used.
- There is a collaborative approach between the people that Howlett and Turnbull met during this Fellowship, with new techniques being discussed and shared.
- The group have backpacks prepared that can be walked into an incident, as many places are inaccessible to vehicles. The packs are housed in a dedicated trailer making storage very easy, and also making them easy to utilise when needed. For example ropes and pulleys are pre-rigged in a pack and you select the number of packs you require.
- The trailer also has portable lights (light emitting diode [LED] lights were used as they provide diffuse lighting), heavy A-frame and tripods, a small gas powered generator, slides/glides, plywood sheets, cribbing, folding chairs, whiteboard and PPE clothing.
- The trailer has been designed so that it is also the incident command centre on site, and has all the necessary equipment, paperwork and resource supplies that may be needed.
- The group noted that they rarely used sedation, as the working relationship with the local veterinarians was not strong. This is an area they are working on.
- Some techniques varied and provided a good discussion point, reflecting their background of fire training compared to the Gimenez' veterinary training.
- During their training courses they emphasise horse behaviour, physical structure and using the horse's own power to assist with rescues. They have a philosophy of minimal restraint, that is to let the horse use their head to balance and to work out where the animal wants to move to as it is less likely to panic and react negatively.
- The group averages 20 calls per year (major animal rescues) and delivers training to rescue crews, workers in other counties/states, veterinarian students and horse groups.
- Their curriculum and training documents are the most developed out of the three training groups visited and are very thorough.

Knowledge Transfer: Applying the Outcomes

Immediate Plans

- Work towards the curriculum for inclusion in the public safety national training package.
- Work with the ISS Institute to run specific information seminars.
- Develop awareness among Victorian emergency services, RSPCA, livestock transporter groups, veterinarians and the general equine public about the imperative need for Large Animal Emergency Rescue (LAER) through seminars.
- Start and contribute to an Australian-wide community of practice with other state emergency services to share information, develop a nationally accredited standardised curriculum and training program, and share resources.
- Liaise with the state rescue board and Emergency Management Australia (EMA), along with the NSW State emergency service (SES).
- Development of a pilot program to be delivered to rescue personnel in conjunction with NSW SES.

Future Plans

- Delivery of information sessions to NCEE equine and agriculture teachers to develop awareness and appreciation of the LAER courses to be delivered by NCEE.
- Delivery of entry-level awareness courses in LAER (as a short course/seminar) for horse owners, trainers, transporters, veterinary nurses.
- Delivery of veterinary specialist training.
- Working with the Victorian Government to bring the Fire/SES (Public Safety Training Package) to Victorian agencies.

Recommendations

Large animal emergency rescue training is necessary from an economic, public relations, social, animal welfare and OH&S perspective. The vast majority of people, including emergency personnel, will put their lives at risk in order to save an animal in distress.

National Training Packages

Development and Inclusion of Units of Competency and Qualifications into National Training Packages – requiring a holistic approach from Federal and State Government workforce training and education departments, Universities, TAFEs, and Registered Training Authorities.

The Fellows recommend that LAER training courses become included in:

- public safety national training packages
- animal care and management training package
- racing training package
- agriculture, horticulture, conservation and land management training package
- transport and logistic training package
- veterinary science university courses
- CFA and equivalent agencies training courses
- animal welfare agencies and RSPCA training courses
- traffic police training courses.

Increase Large Animal Rescue Incidents Awareness

Requiring a cooperative development of appropriate workshops including Federal, State and Local Government authorities involved with emergency services, industries and agencies including SES, police, animal welfare, horse racing, livestock transport, and veterinarians.

The awareness of the need for LAER training must be created in government departments, emergency services, police, animal welfare agencies, veterinarians, horse racing (officials) and livestock transportation groups. Data on the statistics of LAR incidents must be gathered, including:

- incident numbers
- outcomes—successful vs. unsuccessful rescues
- human injuries as a result of rescue attempts
- economic costs.

A study should be undertaken by the National Emergency Services authorities to establish the incident statistics and costs of emergencies involving large animals within Australia.

A program of Large Animal Rescue Incident Awareness to be developed and delivered to all stakeholders, especially the emergency services, including SES, CFA and Police, RSPCA and welfare groups, livestock transporters, veterinarians, racing officials, and the general public, through a series of information seminars and flyers/booklets or DVDs.

Recommendations

Delivery of LAER training

Requiring intensive training and skills transfer to education and training personnel from Registered Training Organisations (RTOs), Universities, and TAFEs.

Delivery of a three-tiered approach to training:

1. Entry-level awareness courses in LAER (as a short course/seminar) for horse owners, trainers, transporters, veterinarian nurses and animal welfare officers and rangers.
2. Large animal behaviour and handling courses delivered to emergency personnel.
3. Operational LAER techniques course delivered to:
 - veterinarians
 - emergency services personnel
 - livestock transportation personnel
 - livestock owners and workers
 - horse racing personnel.

Development of these courses will require funding for the purchase of appropriate LAER equipment for training providers.

Provision of Large Animal Rescue Services

Requiring cooperative implementation of combined services within Federal, State and Local Government authorities involved with Emergency services, and agencies including SES, Police, CFA and RSPCA, and veterinarians.

Based on the experience of successful overseas services, the response to large animal emergencies must be a consistent and holistic approach. Clear roles and responsibilities must be assigned to emergency service providers such as police, SES, and associated professionals such as veterinarians. This will involve development of:

- Clear protocols regarding provision of LAER services.
- A list of accredited LAER service providers.
- Standard response instructions/flowchart, and education of '000' operators in correct process for responding to LAER calls.
- Standard list of LAER emergency equipment, and equipment to be purchased.
- Protocols for LAER ambulance training of personnel, equipment purchase and operation, must occur prior to the creation of an actual LAER ambulance service within high-risk geographic areas of Australia. Followed by the purchase of vehicles and equipment.

Animal Disaster Planning

Requiring cooperative development and implementation of a planning protocol for Federal, State and Local Government authorities involved with emergency services, and agencies including SES, Police, CFA and RSPCA, and veterinarians.

Disaster management involving animals, for both small and large-scale incidents, should be recognised as a vital arm of the Australian Disaster Management protocols. The hurricane Katrina disaster and the recent Victorian bushfires have highlighted the extreme importance people place on the emotional value of their animals.

Recommendations

Emergency services and emergency planners are recognising that the loss of animals has a significant negative effect on people's ability to recover from disasters. Economic impacts from lost livestock, lost production, animal health treatment, as well as clean up and disposal costs of mass animal fatalities are also significant.

Currently Australia's animal disaster planning is concentrated only on the outbreak of exotic diseases.

A national approach to animal disaster and mitigation planning should be developed and enacted, with a plan developed for each local municipality in terms of animal evacuation, emergency care, feed provision, animal health care, disease prevention and control, and waste disposal management.

The above five recommendations should be presented to all levels of government—Federal, State and Local, and involve many departments including those involved with:

- education and training
- agriculture and livestock
- wildlife
- roads and traffic
- police
- fire
- emergency agencies
- transportation—trucks, rail, ship, air
- animal welfare
- animal inspectors and rangers
- public veterinarians
- horse racing
- abattoirs.

International Specialised Skills Institute

How International Specialised Skills Institute can Assist:

- Promotion of information seminars that are aimed at raising awareness.
- Assistance to develop working groups and networks.
- Assistance in mentoring the curriculum development process.
- Assistance in working with government agencies effectively.
- Assistance with sourcing funding for rescue equipment purchases.

The support of all stakeholders along the value chain, including Federal, State and Local Government departments, emergency service providers, commercial operators, agricultural and equine stakeholders, members of the public and animal welfare agencies should be sought to provide funds to International Specialised Skills Institute in order to provide further overseas Fellowships in this sector.

Recommendations

Further Skills Deficiencies

- Animal disaster management planning
- Mitigation planning for animal disasters
- Equipment development and approval for use of equipment to be used for animal rescue techniques (for legalities and OH&S compliance).

Conclusion

Large animal emergency rescue training is an economic and social necessity for Australia. The skills and knowledge gained by the Fellows is just the beginning of a long learning and implementation journey. The support of all stakeholders, including Federal, State and Local Government departments, emergency service providers, commercial operators, agricultural and equine stakeholders, members of the public and animal welfare agencies will be required for change to occur.

Implementation of the five recommendations listed below at a local, regional and ideally national level will begin the process of having a well-established, safe and effective coordinated approach to large animal emergency and disaster management.

1. Development and Inclusion of units of competency and qualifications into national training packages.
2. Increase 'Large Animal Rescue Incidents' awareness.
3. Delivery of LAER training.
4. Provision of large animal rescue services.
5. Animal disaster and mitigation planning.

Further investigation into the development and approval of animal rescue equipment for use in Australia will also be necessary.

Undertaking this Fellowship was an incredibly enriching and enjoyable experience. Howlett and Turnbull wish to acknowledge and thank all the supporters and international experts who were so willing and generous with their information and encouragement.

References

AgriFood Skills Australia, *Racing*, viewed 30 September, 2009, http://www.agrifoodskills.net.au/display_main.php?id=about-racing

AgriFood Skills Australia, *Rural and related industries*, viewed 30 September, 2009, http://www.agrifoodskills.net.au/display_main.php?id=about-rural

Alberta Farm Animal Care Association, 2007, *An Analysis of Commercial Livestock Truck Accidents in Canada and the United States: a report to improve the care of livestock in Transport*, viewed 13th July, 2009, <http://www.afac.ab.ca/annualreports/AFAC07.pdf>

American Animal Hospital Association, 2004 *Pet Owner Survey*, viewed 13th July 2009, <http://www.aahanet.org/media/graphics/petownersurvey2004.pdf>

Federal Emergency Management Agency, *North Carolina Disaster History*, viewed 27th February 2009, http://www.fema.gov/news/disasters_state.fema?id=37

Gimenez, R., Gimenez, T. and May, K.A, *Technical Large Animal Emergency Rescue*, August 2008, Wiley-Blackwell

Green, J., *Rescue and Emergency Medicine Training for Equine Vets* (course notes), BEVA and Hampshire Fire and Rescue Service, 24–25 March, 2009

Hampshire Fire and Rescue Service, *Specialist Response – Animal Rescue Statistics*, viewed 3rd July, 2009, <http://www.hantsfire.gov.uk/theservice/sp-and-sr/specialistresponse/specialistrescues/animalrescue/animalrescuestats.htm>

Jäggin S, Fürst A, Hässig M, Auer J., 'Kick injuries of veterinarians during examination and treatment of horses: a retrospective study in Switzerland.' *Schweiz Arch Tierheilkd.* 2005 Jul;147(7):289

Lantra, The Sector Skills Council for the environmental and land-based sector, *Sector Skills Agreement Equine Industry Annex February 2007*, UK, viewed 3rd July, 2009, <http://www.lantra.co.uk/EasySiteWeb/GatewayLink.aspx?allid=5976>

North Carolina State Animal Response Team, *CAMET by NC SART*, viewed 27th February 2009, <http://nc.sartusa.org/resources/pdf/sart-camet-083007.pdf>

Rowden, P. J. and Steinhardt, D. A. and Sheehan, Mary C. (2008) 'Road crashes involving animals in Australia'. *Accident Analysis and Prevention*, 40(6). pp. 1865–1871, viewed 1st September, 2009, <http://eprints.qut.edu.au/15299/1/15299a.pdf>

Ward, P.L., Wohlt, J. E., Zajac, P. K. and Cooper, K.R., 'Chemical and Physical Properties of Processed Newspaper Compared to Wheat Straw and Wood Shavings as Animal Bedding.' *Journal of Dairy Science*, USA 2000 J Dairy Sci 83:359–367