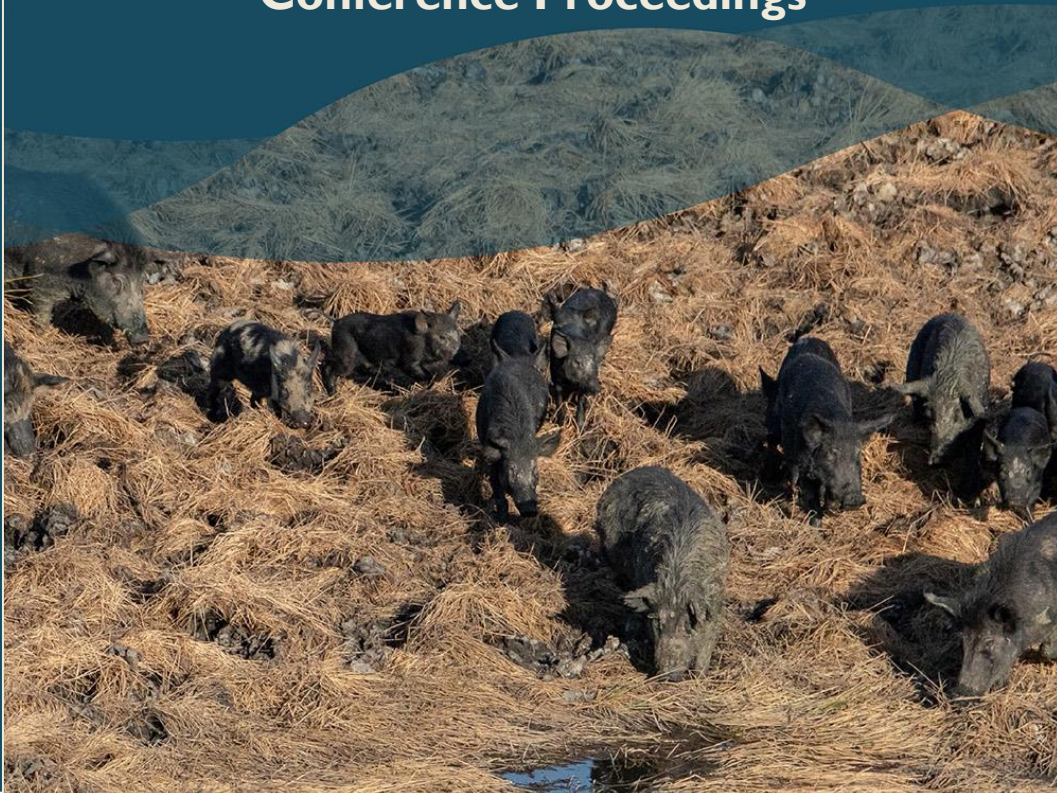


# **NATIONAL FERAL PIG CONFERENCE 2023**

20 - 21 June 2023

Shangri-La Hotel, Cairns, QLD

***Integrated Feral Pig Management:  
Adaptive and Collaborative Action  
Conference Proceedings***



| <b>Day 1 – Tuesday 20 June 2023</b>  |  |
|--|--|
| 8:00am   | Registration table opens   |
| 9:00am   | Opening ceremony and Welcome to Country  |
| 9:15am   | Conference opening address – <i>Senator, the Hon. Murray Watt</i>  |
| 9:20am   | National Feral Pig Action Plan – Achievements, challenges and new opportunities<br><i>Dr Heather Channon, National Feral Pig Management Coordinator</i>  |
| <b>Session 1 - Understanding the feral pig (Chair Quentin Hart)</b>                                |  |
| 9:30am   | <b>Managing feral pigs – the interplay between ecology, methods and desired outcomes - Invited</b><br><i>Dr Peter Caley, CSIRO</i>   |
| 9:50am   | Spatial modelling of Australia’s feral pig population<br><i>Dr Jens Froese, CSIRO</i>  |
| 10:00am  | Beyond the mob mentality: in-field hunter insights can improve feral species management<br><i>Ned Makim, Australian Pig Doggers and Hunters Association</i>  |
| 10:05am  | Zoonotic parasites in feral pigs in Australia – is there a risk?<br><i>Dr Diane Barton, Charles Sturt University</i>   |
| 10:10am  | Session Q&A  |
| 10:20am  | Morning tea  |
| <b>Session 2 - Biosecurity, emergency animal diseases and feral pigs (Chair Shalan Scholfield)</b> |  |
| 10:50am  | <b>Emergency animal disease (EAD) response arrangements in Australia - Invited</b><br><i>Dr Allison Crook, Biosecurity Queensland</i>  |
| 11:10am  | <b>Foot and mouth and ferals – What are we capable of? - Invited</b><br><i>Bec Gray, Local Land Services, NSW</i>  |
| 11:30am  | <b>Modelling the epidemiological interface between livestock and feral pigs in Australia - Invited</b><br><i>Dr Richard Bradhurst, Centre of Excellence for Biosecurity Risk Analysis, University of Melbourne</i> |
| 11:50am  | Feral pig disease surveillance and modelling in NSW<br><i>Dr Andrew Bengsen, NSW Department Primary Industries Vertebrate Pest Research Unit</i>   |
| 12:00pm  | Using tracking data to inform disease transmission and management strategies for feral pig populations<br><i>Dr Deane Smith, NSW Department Primary Industries Vertebrate Pest Research Unit</i>                   |
| 12:10pm  | Foot and mouth outbreak simulation, is it possible to locally eradicate feral pigs?<br><i>Lachlan Marshall, South Queensland Landscapes</i>  |
| 12:20pm  | Understanding feral-domestic pig interactions using camera trap surveillance<br><i>Madalene Oberin, University of Melbourne</i>  |
| 12:30pm  | Session Q&A  |
| 12:45pm  | Lunch  |
| <b>Session 3 - Managing to mitigate impacts and threats (Chair Justin Perry)</b>                   |  |
| 1:30pm   | <b>Population control and monitoring of wild pigs in the US (+Q&amp;A) - Invited</b><br><i>Dr Kurt VerCauteren, National Wildlife Research Center, USDA/APHIS</i>  |
| 2:05pm   | <b>Yes, it’s possible – Integrated Pest Management (IPM) for feral pigs at scale (+Q&amp;A) - Invited</b><br><i>Sheriden Morris, Reef and Rainforest Research Centre</i>   |
| 2:35pm   | Evaluating the Western Riverina Pest Program from 2016 to 2022<br><i>Suzie Holbery, Local Land Services (LLS), NSW</i>   |
| 2:45pm   | A review of a 10-year feral pig aerial shooting program in the Whitsunday Region, Central Queensland<br><i>Bren Fuller, Whitsunday Regional Council</i>  |
| 2:50pm   | Effective control utilising ground shooting with thermal on feral pig populations in large remote landscapes<br><i>Baden Peacock, Animal Control Experts (ACE)</i>   |
| 2:55pm   | Cluster baiting as part of a landscape management approach to feral pig control in the South Johnstone Mill area of the Cassowary Coast Region: case study<br><i>Debra Telford, CANEGROWERS Innisfail</i>          |
| 3:00pm   | Session Q&A  |

## Day 1 – Tuesday 20 June 2023 (Continued)

|        |  |
|--------|--|
| 3:15pm | Afternoon tea  |
|        | <b>Session 4 - Indigenous-led programs - leading by example (Chair Mark Hogno)</b>   |
| 3:45pm | <b>Feraliser, supporting feral animal management, and environmental and social impacts - Invited</b><br><i>Dion Creek and Vince Harrigan, Feraliser</i>  |
| 4:00pm | <b>Feral pigs and mud crabs. A purpose for feral pigs? - Invited</b><br><i>Brenton Cardona, Aboriginal Sea Company</i>   |
| 4:15pm | Aerial feral animal management – Capacity building of Indigenous Land and Environment Rangers<br><i>Desmond Armstrong, Carpentaria Land Council Aboriginal Corporation</i>   |
| 4:30pm | Feral pig management within Budj Bim Cultural Landscape<br><i>Sammy Walsh-Bannan, Gunditj Mirring Traditional Owners Aboriginal Corporation</i>  |
| 4:40pm | The Western Cape Turtle Threat Abatement Alliance (WCTTAA). Indigenous ranger groups reducing pig predation on turtle nests and monitoring the results<br><i>Colby Gill, Western Cape Turtle Threat Abatement Alliance (WCTTAA) and Toby Eastoe, Cape York NRM</i> |
| 4:50pm | Session Q&A  |
| 5:15pm | Finish Day 1 Conference presentations  |
| 6:30pm | <b>Conference dinner - 'The Backyard' Restaurant, Shangri- La Hotel</b>  |

## Day 2 – Wednesday 21 June 2023

|         |  |
|---------|--|
| 7:30am  | Registration table open  |
|         | <b>Session 5 - Getting the basics right - effective monitoring and management (Chair Peter Adams)</b>  |
| 8:30am  | <b>Long range drone monitoring of feral pig populations and impact assessment at landscape scales - Invited</b><br><i>Dr Renee Bartolo, Department of Climate Change, Energy, the Environment and Water</i>                        |
| 8:50am  | <b>A brief overview of how to develop a successful feral animal aerial shooting program - Invited</b><br><i>Bren Fuller, Whitsunday Regional Council</i>   |
| 9:05am  | Broadscale feral pig control: an uphill battle<br><i>Dr Stuart Dawson, WA Department of Primary Industries and Regional Development</i>  |
| 9:15am  | Optimising bait transect placement for feral pig control<br><i>Cameron Wilson, Biosecurity Queensland, Department of Agriculture and Fisheries</i>   |
| 9:25am  | Enhancing the effectiveness of feral pig control and monitoring in Queensland agricultural lands<br><i>Dr Matthew Gentle, Biosecurity Queensland, Department of Agriculture and Fisheries</i>                                      |
| 9:35am  | Thermal aerial surveillance considerations for feral pig monitoring in Western Riverina NSW<br><i>Suzie Holbery, Riverina Local Land Services, NSW</i>   |
| 9:45am  | Ellerslie proof of concept eradication project. How close can we get to eradication at a locality and what is required? A comparison of aerial control techniques<br><i>Rod Baker, Riverina Local Land Services, NSW</i>           |
| 9:55am  | An effective feral pig control program: Piccaninny Plains, Cape York, 2014 - 2023<br><i>Sally Gray, Australian Wildlife Conservancy</i>  |
| 10:05am | Session Q&A - panel discussion   |
| 10:15am | Morning tea  |
|         | <b>Session 6 - Celebrating success, embracing failure- empowering coordinated and collaborative community action (Chair Darren Marshall)</b>   |
| 10:45am | <b>The human dimensions of controlling and managing feral pigs - Invited</b><br><i>Darren Marshall, South Queensland Landscapes</i>  |
| 11:10am | <b>Kangaroo Island feral pig eradication – making the most from a natural disaster, merging local knowledge with novel techniques - Invited</b><br><i>Matt Korcz, Department of Primary Industries and Regions South Australia</i> |

| <b>Day 2 – Wednesday 21 June 2023 (continued)</b>  |  |
|--|--|
| <b>Session 6 - Celebrating success, embracing failure- empowering coordinated and collaborative community action (continued)</b> |  |
| 11:30am  | How can we better engage <i>Homo sapiens</i> to manage <i>Sus scrofa</i> ?<br><i>John Cuskelly, Biosecurity Queensland, Department of Agriculture and Fisheries</i>  |
| 11:40am  | Active and passive stakeholder engagement in feral pig management in complex environments<br><i>Rosemary Madacsi, Toodyay Regional Council</i>   |
| 11:50am  | Pigs might fly- Lessons learned from feral pig control in the Queensland Channel country<br><i>Leanne Kohler, Desert Channels Queensland</i>   |
| 12:00pm  | Community involvement in pest control – an overview of accredited volunteer shooting programs<br><i>Matthew Godson, Sporting Shooters' Association of Australia, National</i>  |
| 12:10pm  | Sow much effort, no funding: can Western Australia's feral pig advisory group root out pig control challenges with a voluntary board, while building community capacity and coordination?<br><i>Kate Duzevich, WA Feral Pig Advisory Group</i> |
| 12:15pm  | Session Q&A - panel discussion   |
| 12:30pm  | Lunch  |
| <b>Session 7 - Economic opportunities and challenges (Chair John Gavin)</b>  |  |
| 1:15pm   | <b>Nature Repair Market - Invited</b><br><i>Dr Ryan Wilson, Department of Climate Change, Energy, the Environment and Water</i>  |
| 1:35pm   | <b>Carbon abatement and biodiversity enhancements from controlling feral ungulates in wetlands to underpin a new carbon method - Invited</b><br><i>Dr Valerie Hagger, The University of Queensland</i>   |
| 2:05pm   | Constructing a Benefit:Cost Analysis for the Western Riverina Pig Program<br><i>Michael Leane, Riverina Local Land Services, NSW</i>   |
| 2:15pm   | Measuring environment costs of feral pig impacts in the Whitsunday Region, Central Queensland<br><i>Bren Fuller, Whitsunday Regional Council</i>   |
| 2:25pm   | Session Q&A - panel discussion   |
| <b>Session 8 - Q&amp;A panel discussion and wrap up (Chair Ricky Archer)</b>   |  |
| 2:45pm   |  |
| 3:30pm   | Afternoon tea and Conference end   |

| <b>Poster presentations</b> |   |
|-----------------------------|---|
|                             | BoarBuster traps in Australia: Testing and adapting the BoarBuster trap to Australian conditions<br><i>Pattie Jeffers and Graham School, GPS Trapping</i>     |
|                             | Integrating AI enabled thermal & multispectral long-range drones into feral pig tracking and removal programs.<br><i>Adam Quinn, Greyman Ops</i>              |
|                             | Sustainable solutions: managing safety and effectiveness for feral pig control in a peri urban setting<br><i>Kate Duzevich, Leschenault Biosecurity Group</i> |

**Invited Presentation**

9.30am Tuesday 20 June 2023

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**Managing feral pigs – the interplay between ecology, methods, and desired outcomes**

**P. Caley<sup>1</sup>**

<sup>1</sup> CSIRO Data61, GPO Box 1700, Canberra, ACT, 2601, Australia

**Corresponding author:** Peter Caley, [Peter.Caley@data61.csiro.au](mailto:Peter.Caley@data61.csiro.au)

**Abstract**

Despite the first wild populations of wild/feral pigs in Australia establishing centuries ago, they are still expanding their range, and many Australians are becoming aware of their presence for the first time. They are a formidable vertebrate pest, with exceptionally high reproductive rates for their body size, well developed group behaviours to defend against predators, a highly developed sense of smell to detect underground food sources, and phenomenal digging capabilities.

Monitoring the effect of control on the size of pig populations is important, but monitoring the effect of control on the damage caused arguably more so, as the relationship between damage and density may not be linear. Land managers should be moving to conduct sufficient monitoring to assess changes in impacts to targeted assets over time. Knowledge of the feral pigs' ecology and behaviour combined with seasonal habitat use within local landscapes, including locations of highly valued food choices (e.g. cropping, wetlands, turtle rookeries) would enable their management to be more effective and efficient. This information is becoming more available. Methods, timing, location and coordination of control that restrict, or better still, prevent access to an asset(s) may generate additional benefits i.e. less access to the asset leads to fewer pigs and hence reduced asset depredation. A combination of control methods may be necessary to remove feral pigs, including older, astute individuals.

The direct physiological impact of expected greenhouse gas induced climate change will probably be a net negative for wild pigs in Australia, though efforts to mitigate climate change may produce more favourable habitats that meld together refuge and food resources. Changing land tenure, with more diversified ownership will possibly make "nil-tenure" approaches to management more difficult to implement, making targeted asset protection an important management tool.

Attitudes towards wild/feral pigs in Australia will continue to evolve, and the understanding and quantification of their impacts on assets is needed to support management decisions. Equally important as controlling unwanted impacts of feral/wild pigs is managing public expectations around what their impacts are, what is possible control-wise, and what are the best practice management procedures available to land managers. Communication between all parties involved has a key role to play.

**Biography**

Peter Caley is a CSIRO research scientist with a strong research record of applying quantitative methods to address contemporary problems in the environmental, agricultural and health sciences. This has included pioneering work on the ecology of wild pigs in the Northern Territory, elucidating the role of wildlife in disease epidemiology in Australia, New Zealand and North America, and providing reliable inference for invasion risk analysis and pest eradication programs. Peter has an ongoing research interest in evaluating the effectiveness of citizen surveillance for vertebrate pests and understanding the dynamics of animal populations.



**Oral Presentation**

9.50am Tuesday 20 June 2023

**Spatial modelling of Australia's feral pig population****J.G. Froese<sup>1</sup>**<sup>1</sup> CSIRO Health & Biosecurity, Dutton Park, QLD, 4102, Australia**Corresponding author:** Jens Froese, [Jens.Froese@csiro.au](mailto:Jens.Froese@csiro.au)**Abstract**

Information about the broad-scale spatial distribution and abundance of feral pigs in Australia is sought after for a range of purposes. For example, it may be used to justify investments and inform policy, on-ground management, monitoring or biosecurity risk analyses. Yet, this information is currently still limited. A national scale map of feral pigs' distribution and relative abundance was assembled by West (2008) from various state-level expert surveys. This map usefully illustrated the extent of the problem, namely that approximately 45% of Australia's land mass is inhabited by feral pigs. However, limitations include its coarse spatial resolution (~50km grid cells), ambiguity around underlying data and expert assumptions, and that it is a static representation of Australia's feral pig population which does account for temporal variability. We have conducted research to improve on this knowledge base using a resource-based modelling approach to predict broad-scale feral pig habitat suitability in south-eastern Australia (Murray et al. 2015), northern Australia (Froese et al. 2017) and Queensland (Froese et al. 2022). The approach couples synthesised knowledge about feral pig ecology (resource requirements for breeding success and feral pigs' ability to access resources) with up-to-date mapped or remotely sensed GIS data products that represent the availability of these resources across the landscape. The key advantage of this approach is that it allowed us to explicitly model the effects of cyclical and seasonal changes in resource availability, which is severely constrained by data limitations in statistical modelling approaches. From the Queensland model we also derived seasonal estimates of potential feral pig abundance (carrying capacity) across different seasons and climate cycles. Results suggested that feral pig populations are constrained by seasonal resource bottlenecks both over both broad and local scales, and that populations can explode in response to vastly increased carrying capacity during wet boom years. Our Queensland-wide carrying capacity estimates (range: 0.6–3.7 million pigs) were broadly consistent with empirically derived estimates previously reported (Gentle et al. 2019; Hone 2020), while also allowing for a nuanced consideration of variability across space and time.

**Biography**

Jens is a landscape ecologist with research expertise in biosecurity and biological invasions, data integration, spatial analysis, risk modelling and structured expert elicitation. He specializes in developing methods, workflows and tools to enable adaptive management of invasive species and other biothreats for improved on ground and policy outcomes. Jens currently serves on the Scientific Advisory Panel to the National Feral Pig Action Plan and the Biosecurity Commons Expert Panel.



5-minute speed talk

10.00am Tuesday 20 June 2023

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**Beyond the mob mentality: in-field hunter insights can improve feral species management.**

**N. Makim<sup>1</sup>**

<sup>1</sup> Australian Pig Doggers and Hunters Association, PO Box 233, Wamuran, Queensland, 4512, Australia

**Corresponding author:** Ned Makim, [nedmakim@yahoo.com.au](mailto:nedmakim@yahoo.com.au)

**Abstract**

Feral pig management consumes significant resources yet struggles to make demonstrable and sustained progress. This presentation seeks to highlight the vast, as yet untapped, resource of hunter knowledge on feral pigs and their behaviour, and its potential application to long-term feral pig management.

Feral animal management, in its current form, tends to limit itself to a few primary control methods. There is a repeated bias against hunting as a valuable approach to pig control among legislated feral pig managers in Australia. This bias can come from the perception that hunter's in-field, practical knowledge is unscientific, outdated pre-conceptions or misinterpretations of contemporary hunting practices, and an unfounded mistrust of the entire pig hunting community.

Feral animal management often espouses a broadscale, multi-disciplinary approach. Insights from hunters – which are often in-depth local knowledge emerging from long-term observations of pig behaviour and ecology – do not necessarily undermine primary management strategies but can both complement and augment these strategies. This is a missed opportunity to tap into the expertise gained annually from millions of hours of observation, contact and eradication achieved by the nation's hunters, thereby reducing management options and the likely effectiveness and efficiency of management programs.

**Biography**

Ned Makim is the Acting National President and a Life Member of the Australian Pig Doggers and Hunters Association (APDHA), an incorporated body which represents recreational and professional pig hunters to legislators, the industry and the community. In that role he has authored submissions on animal welfare law reform in NSW and Qld, given testimony to a NSW Parliamentary Inquiry into animal welfare, sits on the NSW Northern Tablelands Regional Pest Animal Committee and manages the APDHA's research unit. He also runs Three Rivers Environmental, a pest animal and plant management business within the Severn, Macintyre and Gwydir rivers catchments.



5-minute speed talk

10.05am Tuesday 20 June 2023

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**Zoonotic parasites in feral pigs in Australia – is there a risk?**

**D. P. Barton**, H. Fahey, D. J. Jenkins, and S. Shamsi

School of Agricultural, Environmental and Veterinary Sciences, Charles Sturt University, Wagga Wagga, NSW.

**Corresponding author:** Dianne Barton, [dibarton@csu.edu.au](mailto:dibarton@csu.edu.au)

**Abstract**

Consumption of wild game meat is on the increase in Australia due to a combination of increased cultural traditions, a reduction in the stigma associated with consumption of wild game meat, and perceived health and environmental benefits through the hunting and consumption of wild game. Feral pigs, however, have a reputation for being host to a variety of parasites, primarily through anecdotal information and some results published in the 1900s. We conducted a review of the literature regarding feral pigs and their potential zoonotic parasites. Feral pigs have had sporadic, and generally localised, reports of infection with zoonotic parasites, although there has been no systematic survey of pigs, especially in more recent areas of range expansion, for over 30 years. Potential zoonotic parasites of concern include the larval stage of *Spirometra*, species of *Trichinella*, *Taenia solium* and *Toxoplasma gondii*. Although some of these parasites are not yet endemic in Australia, they are endemic in neighbouring countries with a risk of introduction to Australia via importation of meat products. This presentation will briefly discuss the parasites of concern and steps that can be taken by consumers to limit their risk of infection.

**Biography**

Di, David and Shokoofeh are wildlife parasitologists with an interest in detailing the parasites found in various feral animals to determine their overall risk to native Australian wildlife, domestic livestock and pets, and people. Hannah undertook a project on parasites of feral pigs as part of an undergraduate research study, later undertaking an Honours project on *Toxoplasma gondii* in sheep.





**Invited Presentation**

10.50am Tuesday 20 June 2023

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**Emergency animal disease (EAD) response arrangements in Australia**

**A. Crook<sup>1</sup>**

Department of Agriculture and Fisheries, GPO Box 46, Brisbane QLD 4001, Australia

**Corresponding author:** Allison Crook, [allison.crook@daf.qld.gov.au](mailto:allison.crook@daf.qld.gov.au)

**Abstract**

Australia's EAD response arrangements have been assessed as comprehensive and well-understood by system participants. These arrangements support planning for EAD response readiness, and decision-making within a response. Should we face an EAD incident involving feral pigs in future, emergency response decision-making will be dependent upon the specific scenario and informed by available scientific data and on ground expertise. This presentation will outline the approach to an EAD response from a Chief Veterinary Officer's perspective, including relevant considerations about feral pigs.

**Biography**

Allison was raised on a beef and grain property near Warwick in Queensland.

After working in the veterinary pharmaceutical sector for 9.5 years, Allison joined the (then) Department of Primary Industries in Toowoomba as a Senior Veterinary Officer in May 1997. She has worked in a range of areas, including disease investigation and national residue programs, and co-ordinated a team of policy officers working in the animal biosecurity, animal welfare and ethics.

Allison was appointed to the role of General Manager, Animal Biosecurity and Welfare for Biosecurity Queensland within the Department of Agriculture and Fisheries in 2014. In this role, she holds responsibility as the Chief Veterinary Officer for Queensland.

She has extensive experience in management of emergency animal diseases, including the foot-and-mouth disease outbreak in the United Kingdom in 2001, the successful equine influenza eradication response in 2007 –2008, multiple Hendra virus incidents, the white spot disease response in Queensland (2016-17) and the Japanese encephalitis response (2022).



**Invited Presentation**

11.10am Tuesday 20 June 2023

**Foot and Mouth and Ferals – What are we capable of?****Bec Grey**<sup>1</sup> and Paul Hutchings<sup>2</sup><sup>1</sup> Local Land Services, Major Projects, NSW, Australia<sup>2</sup> Local Land Services, Northern Tablelands, 15 Vivian St, Inverell, NSW, 2360, Australia**Corresponding author:** Bec Gray, [Bec.Gray@lls.nsw.gov.au](mailto:Bec.Gray@lls.nsw.gov.au)**Abstract**Proof of concept for local eradication around a theoretical infected premise

Local eradication of cloven-hoofed pest animals is an ambitious target. If foot and mouth disease (FMD) is confirmed in an area it is vital to reduce susceptible pest species (cloven-hoofed vertebrates) to limit the spread of the disease. The role played by feral susceptible species in virus transmission is largely determined by their population densities and level of interaction with domestic susceptible species.

Eleven Local Land Services regions planned and are currently implementing coordinated, integrated and broadscale cloven-hoofed vertebrate pest animal control programs within intensive pest control zones (IPCZ) across the state as part of the FMD preparedness and prevention program. IPCZs were defined by a 10km radius from a theoretical infected premise. IPCZs allowed for alternative approaches to controlling pest animals to be evaluated on their effectiveness for reducing a pest population.

Pre- and post-control monitoring is being completed across all IPCZ, aligning with the Vertebrate Pest Research Unit (VPRU) recommended distance sampling methodology. Surveys were completed using established monitoring techniques such as aerial visual and aerial thermal monitoring techniques. Thermal drones were used in two IPCZs, contributing to the evaluation of techniques. Results of pre-control monitoring showed the IPCZs had varied population densities and detections during sampling.

The control effort and intensity of effort was varied across the IPCZs which further adds to the evaluation of effort required to reduce populations.

Control effort ranged from targeted ground control campaigns of baiting, trapping and shooting, through to intensive and frequent aerial control programs, and a combination of both. Thermal technology was used during some aerial control programs, though not all.

The analysis of IPCZs will inform best practice recommendations for vertebrate pest animal population management. The findings of this program will contribute to the discussions relating to control technique effectiveness, effort required for population reduction, home range sizes, vertebrate pest re-invasion timeframes and organisational capacity to respond to an EAD outbreak. The program concludes 30 June 2023, with project findings coming in the following months.

**Biography**

Bec Gray is a Senior Project and Programs Officer in the Foot and Mouth Disease Program at Local Land Services. She has been with the organization for over 10 years and has a wealth of experience in pest control and biosecurity. She is passionate about protecting the environment and ensuring that NSW is a safe and healthy place to live. Bec Gray is a valuable asset to Local Land Services and her work is making a real difference in the fight against invasive species. She is a dedicated and experienced professional who is passionate about protecting the environment.



**Invited Presentation**

11.30am Tuesday 20 June 2023

**Modelling the epidemiological interface between domestic and feral pig populations in Australia****R. Bradhurst**<sup>1</sup>, G. Garner<sup>2</sup>, S. Roche<sup>2</sup>, N. Kung<sup>3</sup>, B. Robinson<sup>3</sup>, S. Willis<sup>3</sup>, K. Richards<sup>4</sup>, B. Cowled<sup>5</sup>, S. Firestone<sup>6</sup>, M. Stevenson<sup>6</sup>, M. Oberin<sup>6</sup>, C. Tharle<sup>6</sup>, L. Naing<sup>1</sup>, H. Taha<sup>2</sup>, E. Sellens<sup>2</sup> and A. Breed<sup>2</sup><sup>1</sup> Centre of Excellence for Biosecurity Risk Analysis, University of Melbourne, Vic, Australia<sup>2</sup> Department of Agriculture, Fisheries and Forestry, Australia<sup>3</sup> Department of Agriculture and Fisheries, QLD, Australia<sup>4</sup> SunPork Group, Australia<sup>5</sup> Ausvet Pty Ltd, Australia<sup>6</sup> Melbourne Veterinary School, University of Melbourne, Vic, Australia**Corresponding author:** Richard Bradhurst, [Richard.Bradhurst@unimelb.edu.au](mailto:Richard.Bradhurst@unimelb.edu.au)**Abstract**

The challenge of planning for emergency animal disease outbreaks can be compounded by the complex epidemiological interplay between livestock, wild animals, and the environment. If an emergency animal disease such as African swine fever (ASF) or foot-and-mouth disease (FMD) were to enter the feral pig population in Australia it is unclear whether it would establish and pose an ongoing threat to domestic pigs. Epidemiological models can assist in the formation of animal health policy for emergency animal disease, especially where field studies are not possible or practical.

The Australian Animal Disease Spread model (AADIS) is used by animal health authorities in Australia to support disease planning and preparedness. A national-scale AADIS-ASF model was developed to represent the domestic and feral pig populations in Australia and simulate the potential spread and control of ASF within and between them.

The degree of spillover transmission between domestic and feral pigs was highly dependent on production system characteristics, on-farm biosecurity, feral pig density, contact rates between feral pig groups and between domestic and feral pigs, and regional and seasonal influences on feral pig carcass decay.

The epidemiological interface between domestic and feral animals is a complex problem in time and space, especially in the context of a large country such as Australia with diverse ecological regions and production systems. The AADIS model can help explore the potential spread and control of emergency diseases and the likelihood of spillover back and forth between domestic and feral populations. The project highlighted the importance of credible estimates of feral pig distribution and abundance, and the need for further research into regional and seasonal influences on contact rates with livestock.

**Biography**

Dr Richard Bradhurst is a Senior Research Fellow at the University of Melbourne, a Chief Investigator at the Centre of Excellence for Biosecurity Risk Analysis (CEBRA), and recipient of the 2022 Australian Biosecurity Award for Science and Innovation. Richard works closely with veterinary epidemiologists and animal health specialists from over 20 countries developing the Australian Animal Disease Spread model (AADIS) ([www.aadis.org.au](http://www.aadis.org.au)) and the European Foot-and-Mouth Disease Spread Model (EuFMDiS). These models assist in planning and preparedness for emergency animal diseases by simulating incursion, spread, detection, control, and proof-of-freedom.



**Oral Presentation**

11.50am Tuesday 20 June 2023

**Feral pig disease surveillance and modelling in NSW****A. Bengsen**, F. Silva and L. Parker

NSW Department of Primary Industries Vertebrate Pest Research Unit, 4 Marsden Park Road, Calala NSW 2340, Australia

**Corresponding author:** Andrew Bengsen, [Andrew.Bengsen@dpi.nsw.gov.au](mailto:Andrew.Bengsen@dpi.nsw.gov.au)**Abstract**

Emergency animal diseases (EADs) such as foot and mouth disease and African swine fever have the potential to cause catastrophic long-term harm to individual producers and the national economy. There is currently an elevated risk that an EAD could become established in feral pig populations in Australia long before it is discovered through passive surveillance. NSW DPI's Vertebrate Pest Research Unit is undertaking a two-pronged program to reduce risk and uncertainty.

One arm of the project is developing a risk-based active surveillance scheme that will enable early detection of, and effective response to, EAD incursions in feral pig populations within NSW. An adaptive sampling component will allow efficient estimation of pathogen distribution and prevalence upon detection of an EAD incursion. As well as striving to provide information needed for an effective and timely response to EAD incursions in wild hosts, the surveillance program is actively collecting data to improve our understanding of emerging and sporadic diseases in feral pigs.

The second arm of the project is developing management strategies based on realistic models of disease establishment and transmission in feral pig populations. This requires better models and better data. We are working to develop better models with colleagues at other state agencies and universities. We are drawing on our existing data on pig movement, density, and management effectiveness, and will collect new data as needed to populate new models.

An EAD incursion in a feral pig population will require high stakes decisions to be made urgently in an environment of great uncertainty. This project is working to reduce the duration and severity of an EAD incursion in feral pig populations by reducing both the risk of long sleeper periods until an incursion is detected and the uncertainty in information needed to mount a rapid and effective response.

**Biography**

Andrew is a Senior Research Scientist with NSW DPI's Vertebrate Pest Research Unit. He's been continually involved in feral pig research since starting his PhD on feral pig management just up the road in the Daintree rainforest in 2006.



**Oral Presentation**

12.00pm Tuesday 20 June 2023

**Using tracking data to inform disease transmission and management strategies for feral pig populations****Deane Smith**<sup>1,2</sup>, Darren Marshall<sup>3</sup>, Lachlan Marshall<sup>3</sup>, Paul Meek<sup>4</sup>, Peter Fleming<sup>5</sup><sup>1</sup> Vertebrate Pest Research Unit, NSW Department of Primary Industries, PO Box 350, Armidale, NSW 2350, Australia<sup>2</sup> Ecosystem Management School of Environmental and Rural Sciences, University of New England, Armidale, NSW 2351, Australia.<sup>3</sup> Southern Queensland Landscapes, 266 Margaret Street, Toowoomba, Qld 4350, Australia.<sup>4</sup> Vertebrate Pest Research Unit, NSW Department of Primary Industries, PO Box 350, Coffs Harbour, NSW 2450, Australia<sup>5</sup> Vertebrate Pest Research Unit, NSW Department of Primary Industries, PO Box 350, Orange, NSW 2800, Australia**Corresponding author:** Deane Smith, [deane.smith@dpi.nsw.gov.au](mailto:deane.smith@dpi.nsw.gov.au)**Abstract**

Feral pigs are a significant threat to both wildlife and agriculture, causing ecological and economic damage globally. They are also known carriers of several diseases, including Foot and Mouth Disease and African Swine Fever, which can have severe consequences for the Australian agriculture industry. Therefore, understanding the dynamics of disease transmission in feral pig populations is essential for effective management and control of both the feral pig population and disease outbreaks. Here, we present the foundations of our project that plans to use empirical data to inform disease modelling in feral pigs. We will analyse data collected from Australia-wide surveillance programs that monitor the feral pigs movement through GPS tracking data. This data will be used to inform disease transmission and evaluate the effectiveness of different control strategies in the event of an exotic disease outbreak. Our approach aims to provide a better understanding of movement in feral pig populations and to inform decision-making for feral pig management and exotic disease preparedness and planning control at a national level. The results of this study will also be valuable for policymakers and wildlife managers seeking to reduce the impact of feral pigs on ecosystems and agriculture.

**Biography**

Deane completed a doctorate at the University of Southern Queensland, focusing on pest exclusion fencing and wildlife management on agricultural land. He has since worked in both the private and public sectors in the wildlife research space. Deane's current role is as a Research Officer in the Western Tracks, and Exotic Animal Disease Preparedness Projects for New South Wales Department of Primary Industries in Armidale. Deane has strong interests and expertise in wildlife management, movement ecology and applied molecular ecology.



**Oral Presentation**

12.10pm Tuesday 20 June 2023

**Foot and mouth outbreak simulation, is it possible to locally eradicate feral pigs?****L. Marshall<sup>1</sup>**, M. Tarrant<sup>2</sup>, E. Keyte<sup>2</sup>, D. Marshall<sup>1</sup><sup>1</sup> Southern Queensland Landscapes, 266 Margaret St, Toowoomba, QLD 4350, Australia<sup>2</sup> Local Land Services, Northern Tablelands, 15 Vivian St, Inverell, NSW 2360, Australia**Corresponding author:** Lachlan Marshall, [lachlan.marshall@sqlandscapes.org.au](mailto:lachlan.marshall@sqlandscapes.org.au)**Abstract**

It is thought that feral pigs (*Sus Scrofa*) inhabit around 40% of Australia's mainland land since their arrival as domestic stock with the first fleet in 1788. These imported pigs roamed free and soon established independent feral populations that have expanded over time. Feral pigs pose a significant environmental, agricultural, economic and biosecurity threat to our fragile environment. They are considered one of Australia's most destructive feral animals, impacting agricultural practices through their damage to crops, pasture, predation on livestock (lambs/kids), destroying infrastructure and promoting soil degradation. Furthermore, feral pigs carry several diseases of economic importance to the Australian livestock industries. Specifically, their potential role in carrying, spreading, and amplifying foot and mouth disease (FMD) has escalated concern of many cattle and sheep producers wanting to remain FMD free.

A collaboration between Northern Tablelands Local Land Services (NTLLS), Southern Queensland Landscapes (SQL) and land managers within northern NSW aims to locally eradicate feral pigs within 5km and 10km buffer zones around a simulated FMD outbreak point. Various control techniques such as aerial shooting, 1080 and HOGGONE baiting, trapping and thermal ground shooting will be implemented across a six-month period to establish if it is possible to locally eradicate feral pigs within these buffer zones. GPS collars were fitted to individual feral pigs before the control activities were implemented to monitor movement patterns during the intensive control period, their preferred habitat use during this time and finally as a judas techniques to destroy any remaining animals in the landscape.

This presentation aims to discuss the monitoring techniques, the range of control techniques implemented, and the results of the project to date, with a focus on the GPS collar movements.

**Biography**

Lachlan Marshall is a Project Delivery Officer for Southern Queensland Landscapes (SQL) based in Toowoomba, Queensland. After studying ecology and conservation biology at Griffith, Lachlan joined SQL as a Project Delivery Officer within the Vertebrate Pest and Wildlife team. His role is predominantly focused on using GPS tracking collars to understand how and when feral pigs use the landscape and to engage communities to control feral pigs.



**Oral Presentation**

12.20pm Tuesday 20 June 2023

**Understanding feral-domestic pig interactions using camera trap surveillance****M. Oberin<sup>1</sup>, V. Brookes<sup>2</sup>, M. Stevenson<sup>1</sup>, R. Bradhurst<sup>3</sup> and S. Firestone<sup>1</sup>**<sup>1</sup> Melbourne Veterinary School, The University of Melbourne, Parkville, VIC 3010, Australia<sup>2</sup> Sydney School of Veterinary Science, The University of Sydney, Camden, NSW 2006, Australia<sup>3</sup> Centre of Excellence for Biosecurity Risk Analysis, The University of Melbourne, Parkville, VIC 3010, Australia**Corresponding author:** Madalene Oberin, [madalene.oberin@unimelb.edu.au](mailto:madalene.oberin@unimelb.edu.au)**Abstract**

Feral pigs (*Sus scrofa*) in Australia are recognised as an invasive pest species, causing destruction to many environmental and agricultural resources around the country. The disease risks posed by feral pigs interacting with domestic pigs is a significant threat to the pork industry. There is currently limited reporting data or evidence that quantifies contacts between feral and domestic pigs, and therefore, the potential for feral pigs to spread disease may be underestimated or underreported. In this study, we are investigating the frequency of interactions between feral and domestic pigs, and the probability of detecting these interactions through camera trap surveillance strategies.

To determine if feral pigs were present at the study site (in Southeast Queensland), camera traps were initially deployed in hotspot locations deemed highly suitable for feral pig visitation over 7 weeks. Once the presence of feral pigs was confirmed, 55 cameras were deployed and positioned according to a QGIS hexagonal grid layer in which grid cells were 40m in diameter based on the estimated camera trap field of view. Cameras were positioned in adjoining cells, preferentially at the cell centroid, to create an enclosed boundary 'loop' around the property, as well as in hotspot locations inside the property. The cameras use motion sensors and infrared technology to detect movement and were programmed to take a series of 3 images per trigger with no delay. Data collection is scheduled every 6-8 weeks over a 12-month period to capture the potential influence of seasonality of feral pig activity. The data is being processed through an automatic image recognition software which detects the presence of feral pig in images. We will validate the proposed methodology against an 'theoretically ideal' surveillance strategy to convey various levels of confidence in feral pig detections using different camera trap coverage options.

The monitoring system was deployed in March-April 2023. Preliminary results from 9 hotspot and 8 fence-line cameras have detected the presence of feral pigs in 4,985 images within 5 weeks. These early findings highlight presence in close proximity to the domestic piggery, which could lead to potential disease transmission.

This study will help determine if feral-domestic pig interactions are occurring and provide potential contact rate estimates for parameterising epidemiological models in Australia. The study will produce a protocol for pork enterprises to self-implement camera trap surveillance, tailoring it to their specific feral pig risk and available resources.

**Biography**

Madalene Oberin is a PhD student within the Melbourne Veterinary School at the University of Melbourne. Her supervisors are A/Prof Simon Firestone, Dr Richard Bradhurst, Dr Victoria Brookes and Professor Mark Stevenson. Her research focuses on investigating the interactions between feral and domestic pigs to help inform and better parameterise epidemiological models on the potential risk of African swine fever (ASF) spread within Australia. The results from Madalene's projects will promote data-driven biosecurity behaviour change, decision-making by domestic pork producers, also support APL policy and quality systems with respect to the risks posed by feral pigs.



Invited Presentation + Q&A

1.30pm Tuesday 20 June 2023

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**Population control and monitoring of wild pigs in North America**

**K. VerCauteren<sup>1</sup>, D. Cole<sup>2</sup>, R. Brook<sup>3</sup>, K. Pepin<sup>1</sup> and N. Snow<sup>1</sup>**

<sup>1</sup> National Wildlife Research Center, United States Department of Agriculture, 4101 Laporte Ave., Fort Collins, CO, 80521 USA

<sup>2</sup> National Feral Swine Damage Management Program, United States Department of Agriculture, 4101 Laporte Ave., Fort Collins, CO, 80521 USA

<sup>3</sup> University of Saskatchewan, 6D14 Agriculture Building, Saskatoon, Sask., S7N 5A8, Canada

**Corresponding author:** Kurt VerCauteren, [kurt.c.vercauteren@usda.gov](mailto:kurt.c.vercauteren@usda.gov)

**Abstract**

Non-native, invasive wild pigs are one of the greatest challenges facing wildlife managers in North America. Though present on the landscape since Europeans settled the continent, populations of pigs did not start growing and spreading especially rapidly until the 1980s. In recent decades they have become especially destructive ecologically and economically. The magnitude and breadth of the impacts they have in natural and anthropogenic settings are not yet fully realized and difficult to quantify. To this end, supported by the prerequisite funding required, research and management efforts to address wild pigs have amplified. In this presentation we describe the current situation with wild pigs in North America, highlighting our successes, challenges, and way forward.

**Biography**

Kurt VerCauteren is a Supervisory Research Wildlife Biologist with the National Wildlife Research Center of the United States Department of Agriculture. His work focuses on addressing human-wildlife conflict and the management of damage and disease. Primary species he works with include wild pigs, deer and elk. Much of his work is conducted at the interface of wildlife and agriculture.





Invited Presentation + Q&A

2.05pm Tuesday 20 June 2023

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**Yes, it's possible – Integrated Pest Management (IPM) for feral pigs at scale.**

**S. Morris**

Reef and Rainforest Research Centre Limited, 9 Abbott Street, Cairns, QLD, 4870, Australia

**Corresponding author:** Sheriden Morris, [sheriden.morris@rrrc.org.au](mailto:sheriden.morris@rrrc.org.au)

**Abstract**

Northern Australians are fully aware of the efforts to control feral pigs that impact our farming land, our unique ecosystems and the delicate balance of predator architecture. Introduced with European settlement feral pigs have been identified as a major issue facing the management of the Wet Tropics World Heritage Area (WTWHA) and adjacent farming lands with a series of efforts focused on control. Trapping, shooting poisoning techniques have been applied across the north, often with early but unsustained success.

There is an opportunity to apply an Integrated Pest Management (IPM) approach at scale across the 9000 km<sup>2</sup> of the WTWHA. IPM was first developed to control pest species in agriculture. The transition of IPM to ecological management in recent years has provided a more comprehensive framework for which to manage multiple efforts targeted at large scale pest control. IPM is implemented through an economic algorithm that is parametrised with biological factors. It provides the most effective control achievable within the constraints of the resources that are available. To apply this approach at scale, a significant amount of detail is required regarding factors such as, spatial distribution, dispersal methods/preference, food preference, life cycle factors, habitat fidelity, communication capacity, vulnerabilities, control methodologies, etc. along with a competent understanding of social determinants and resource availability which will provide the constraining guide rails for implementation. At first glance, this approach appears relatively simple however, the experience of developing the Great Barrier Reef- wide Crown of Thorns Starfish IPM control program highlights the challenges of developing and succeeding at controlling a serious coral predator at scale, within a world heritage area.

**Biography**

Under Sheriden's leadership (since 2006), the Reef and Rainforest Research Centre (RRRC) has conceived, managed and delivered more than \$350 million-worth of environmental research and development programs in northern Australia. In addition, she also chairs the CRC for Developing Northern Australia and Citizens of the GBR. Sheriden has designed and driven the National Environmental Science Program to deliver science solutions for the tropics through managing multi-disciplinary, multi-institutional, large-scale environmental research and monitoring programs over the last 18 years. As an extensive contributor to land and sea management policy, she has also spearheaded the development and implementation of an innovative aid development program on Australia's northern borderlands with Papua New Guinea. These Programs are delivered in a culturally appropriate form to meet the needs of industry, government, non-government agencies, Indigenous communities, and other stakeholders.

Sheriden's unusual scientific background and work history means she has always been a champion of disruptive ideas. The RRRC notoriously goes where established scientific institutions often fear to tread, using novel ideas, approaches and tools to find solutions to problems that were previously considered intractable. The problem of serious starfish outbreaks on the GBR was one example – for decades there had been controversy over whether control efforts were effective, and the scale at which management had to occur seemed overwhelming. Here the capacity to assemble appropriate teams of scientists, acquire research funding, and drive the research and implementation programs has resulted in a scientifically rigorous demonstration that IPM-informed starfish control is working to saving live coral and building resilience across the Reef. Sheriden won the 2023 Banksia Prize for Biodiversity for this body of work and was also a finalist at the 2022 Eureka Prizes in the Applied Environmental Research category.



Oral Presentation

2.35pm Tuesday 20 June 2023

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**Evaluating the Western Riverina Pest Program from 2016 to 2022**

**S. Holbery<sup>1</sup>**, and M. Leane<sup>2</sup>

<sup>1</sup> Local Land Services, Lachlan Street, Hay, NSW, 2711, Australia

<sup>2</sup> Local Land Services, Sheridan Street, Gundagai, NSW, 2722, Australia

**Corresponding author:** Suzie Holbery, [suzie.holbery@lls.nsw.gov.au](mailto:suzie.holbery@lls.nsw.gov.au)

**Abstract**

In 2023 the Western Riverina Pest Program (WRPP) commissioned an evaluation of the program's first six years commencing in 2016. The study evaluated the program against four criteria: impact, effectiveness, appropriateness, and legacy. The WRPP is a coordinated feral pig control program over 1.4 million hectares of riparian river red gum and native shrubland vegetation types in western NSW. There are public and private land managers within the program area. The program was externally evaluated using 15 Key Evaluation Questions (KEQ) and two sources of evidence: documentation related to the project, and the responses from 20 structured interviews. Interviewees included WRPP committee members, public and private land managers, participating and non-participating landholders. Each KEQ was given one of three ratings based on the captured evidence. The results have reinforced known vertebrate pest control principles:

- 1) develop a robust program design;
- 2) ensure appropriate and sufficient monitoring capable of measuring your objectives;
- 3) utilise adaptive management;
- 4) accurately collect, collate, and report on data;
- 5) build the capacity of land managers to take responsibility for biosecurity obligations.

Whilst the WRPP has incorporated these principles to varying degrees; competing priorities, the availability and allocation of resources, and the willingness of land managers to participate are all critical factors that influenced whether the objectives of the WRPP pest control plan could be achieved. Moving forward it is the program's intension to review our objectives and make improvements to the program design that will increase alignment to the principles listed above. Evaluations are not something program managers need to be fearful of. They should be viewed as a way to enhance vertebrate pest control for the long term, ultimately protecting our environment and agricultural resources.

**Biography**

A Senior Biosecurity Officer for Riverina Local Land Services since 2015. Predominantly working as the Program Coordinator for the Western Riverina Pest Program and the southeast Hay rabbit management program. Came to Local Land Services following a career in agricultural research for various interstate departments.



**5-minute speed talk**

2.45pm Tuesday 20 June 2023

**A review of a 10-year feral pig aerial shooting program in the Whitsunday Region, Central QLD****B. Fuller** and S. M. Hardy

Whitsunday Regional Council, 83-85 Main Street, Proserpine, QLD, 4800, Australia

**Corresponding author:** Bren Fuller, [bren.fuller@whitsundayrc.qld.gov.au](mailto:bren.fuller@whitsundayrc.qld.gov.au)**Abstract**

The Whitsunday Regional Council commenced an Aerial Shooting Program in 2012. Over the last 10 years, the Aerial Shooting Program has been refined and improved. The population of feral pigs in the Whitsunday region, the return in costs per pig controlled and the economic impacts of feral pigs were estimated for three key agricultural industries in the region and the environment. The outcomes from this project are summarised below:

- Since 2012, 12,303 pigs have been removed at a cost of \$674,884 (or \$54.86 per animal based on cash contributions only or \$75.92 per pig once in-kind costs were included).
- The Whitsunday Regional Council has used two methods to estimate feral pig populations:
  - Using broad landscape densities, the population was estimated at 16,000 individuals.
  - Using aerial shooting flight paths and the number of feral pigs destroyed, a population of 19,000 individuals was estimated.
  - Land manager feral pig culling activities and the Aerial Shooting Program are holding the population steady or slightly declining.
- Economic impacts:
  - Total direct agricultural impact approximately \$7.3 million/yr across the region.
  - Costs to sugarcane = \$0.6 Million/yr, beef = \$2.7 million/yr, horticulture = \$4.0 Million/yr.
  - Total agricultural impact (including indirect impacts) = \$12.58 million/yr given the current feral pig population of 19,000.
  - Economic impact on agriculture in the Whitsunday region due to feral pigs was estimated at \$662/pig/year at the current population level of 19,000.
- Environmental assets in the Whitsunday region:
  - Estimated impacts of feral pigs on the environment = \$28 million/yr.
  - Estimated average cost to environmental assets = \$1473/pig/yr at the current population level.
- Establishing an economic return on the Program:
  - Combined economic and environmental benefits for 2020-21 was estimated at \$4,248,650.
  - Cost of Whitsunday program in 2021-22 = \$225,600, including in kind contributions.
  - For every \$1 invested, the return on investment was \$18.83.
- Social outcomes:
  - The Program is coordinated across five local government areas (Burdekin, Isaac, Charters towers, Mackay and Whitsunday).
  - There is a growing confidence from landholders that there is value being involved and financially supporting the Program based on verbal feedback and willingness to pay the participation fees.
  - Involves between 8 to 19 organisations and 80 land managers per year.
  - The majority of land managers have been engaged in the Program for more than one year.

**Biography**

Bren started his involvement in feral animal control in the mid-1990's in Arnhem land and Gove in the Northern territory. In 2006 Bren moved back to the Whitsundays to take up a role with the Whitsunday Regional Council as a Land Protection Officer with a focus on feral animal control and weed management. Over the last 17 years, Bren has assisted the Whitsunday Council to develop a dedicated Feral Animal Control Program with aerial shooting being added in 2012. Bren is also a keen recreational shooter and is a member of the Bowen SSAA Club.



**5-minute speed talk**

2.50pm Tuesday 20 June 2023

**Effective control utilising ground shooting with thermal on feral-pig populations in large remote landscapes.****B. Peacock**

Animal Control Experts (ACE), 1625 Wivenhoe Somerset Road, Dundas, QLD, 4306, Australia

**Corresponding author:** Baden Peacock, [baden@animalcontrolexperts.com.au](mailto:baden@animalcontrolexperts.com.au)**Abstract**

Feral pigs (*Sus scrofa*) are widespread with increasing populations in the remote region of south-west Queensland. Feral pigs are destructive to the environment and pose a risk to the productivity of the agriculture industry through the destruction of fodder and potentially transmitting zoonotic diseases.

A variety of control techniques are often employed singularly or in combination by landowners or contractors to slow pig numbers. There is a need to employ method/s that are cost-effective, humane and with consideration of time expenditure and personnel cost to achieve desired control outcomes as well as environmental impact. Is ground shooting with thermal, over large multi-terrain landscapes, a viable method that can achieve these program endpoints?

This field exercise was conducted in early 2023 utilising thermal imaging equipment and shooting in a remote landscape. Program data would inform future viability and structure of ground shooting feral pig programs to achieve desired outcomes for property owners/managers and stakeholders.

The program was conducted over eight days in SW Qld on a private pastoral company with the land size of 38590 hectares. Comprising of wetlands, salt flats, mulga, and red sand hill environments. Schematic terrain and map analysis was conducted to target population rich habitats utilising simple method of walking and shooting at dawn and dusk were trialled.

On majority of the dawn shoots (4.00am to 6.00am) pigs were found to be foraging on flat open grass country within 500m of tangled lignum bordering water holdings. On average eight pigs were identified, four pigs were culled before losing visibility and opportunities for humane shooting of animals. Dusk (5.00pm to 8.00pm) pigs were identified to be trafficking from tangled lignum areas to foraging grass regions. On average two pigs were removed before losing humane opportunities for shooting. The population is likely to escape this method following an abundance in food supply.

Given the results, the effectiveness of ground shooting in large food enriched environments is not recommended for a sustained practice. Ground shooting should be a supplement and used in conjunction with other more effective control measures such as aerial shooting to achieve desired outcome of effective population control with an economic consideration.

**Biography**

Baden Peacock is a licenced professional pest animal technician, who is owner-operator of Animal Control Experts (ACE) which services Queensland and some areas in New South Wales, working in a variety of landscapes including peri-urban and rural settings. An appreciation for procedures and policies, attention to detail and hard work ethic lies in Baden's background in the Australian Defence Force and Special Operations command of over a decade. His primary focus is establishing respectful and collaborative working relationships with landowners, businesses and stakeholders to ensure tailored feral animal control programs are implemented with minimal impact to infrastructure and non-target species and are cost-effective and sustainable.



## 5-minute speed talk

2.55pm Tuesday 20 June 2023

**Cluster baiting as part of a landscape management approach to feral pig control in the South Johnstone Mill area of the Cassowary Coast region: case study**D. Telford<sup>1</sup> and K. Harrington<sup>2</sup><sup>1</sup> CANEGROWERS Innisfail, 18-24 Bruce Highway, Mourilyan, Queensland, Australia<sup>2</sup> Cassowary Coast Regional Council, 70 Rankin Street, Innisfail, Queensland, AustraliaCorresponding author: Debra Telford, [Debra.Telford@canegrowers.com.au](mailto:Debra.Telford@canegrowers.com.au)**Abstract**

Each year, feral pigs cause more than \$800,000 in lost income to affected sugarcane farmers in the Innisfail district of the South Johnstone Mill cane supply area. Landholders are responsible for managing feral pigs on their property, however current methods of control are having little to no impact on the level of damage sustained by impacted growers and the wider industry. A Landscape Management approach to feral pig control is promoted as the most effective way to reduce feral pig damage. One component of the Landscape Management Approach is to bait using bananas injected with 1080 on a cluster of farms, follow up with an aerial cull, then manage remaining feral pig numbers using trapping, hunting, strategic baiting and harbourage management.

In this case study, industry and local government worked together to implement a cluster baiting program in the New Harbourline district of the Cassowary Coast Region. An intensive baiting program was conducted over 1000 hectares during August 2022. With nine baiting opportunities during this period, landholders, CANEGROWERS Innisfail representatives and Cassowary Coast Regional Council (CCRC) staff committed 314 hours to the program to deliver 180kg of 1080 baited bananas to 32 sites. This time included daily inspection of the bait sites, collation of landholder data to meet CCRC requirements and CCRC staff to coordinate and supply baits. Quantifying the number of feral pigs removed through baiting was not possible as there were only two sightings of pig carcasses. Two weeks after the completion of baiting, an aerial cull was conducted. This follow-up action resulted in the removal of 22 pigs.

Overall, the trial program was able to show the concept of cluster baiting had potential. However, success with this landscape management approach is not to treat feral pig control as a single event, baiting needs to continue until no further damage is sustained along with implementation of a variety of other control measures. Cluster baiting was dependent on a lot of labour and working hours as well as all parties to agree to and to follow a well-developed plan. Key to the success of such a large program is landholders working together and a dedicated staff member to not only coordinate but be involved with on-ground extension and delivery.

**Biography**

With three decades of experience in the sugar industry, Deb holds the respected position of Canegrowers Grower Services Manager in the Innisfail district. Recognised for her dedication to prioritising the growers' needs, Deb is highly regarded as an extension practitioner. She actively contributes her expertise to influential industry initiatives such as Smartcane BMP, Paddock to Reef Monitoring Program, Wet Tropics Major Integrated Project, and the State-wide Extension Model of Practice. Deb is instrumental in delivering projects to enable the adoption of sustainable practices to increase productivity, enhance profitability, and reduce the environmental impact of farming activities.



**Invited Presentation**

3.45pm Tuesday 20 June 2023

**Feraliser, supporting feral animal management, environmental and social impact****D. Creek, V. Harrigan, and J. Perry**

Feraliser, 61 Abbott Street, Cairns, QLD, 4870, Australia

**Corresponding author:** Dion Creek, [Dcreek@cylc.org.au](mailto:Dcreek@cylc.org.au)**Abstract**

Feral pigs are one of the world's most invasive species. Cape York Peninsula, northern Queensland, has the highest population of feral pigs Australia causing significant negative impacts to environmental and cultural assets. Kalan Enterprises is a Traditional Owner business based in Coen, central Cape York. In 2012 Kalan reviewed their feral pig management program and highlighted some critical issues with the consistency and amount of funding available to conduct ongoing feral pig control. Despite significant effort and expense, they were not getting positive impacts on important wetlands. Kalan joined forces with a group of partners to explore opportunities to utilise feral pig carcasses to support management that protected their core values. After an exhaustive review of potential business opportunities, the production of fertiliser became the most viable option. 10 years on, Feraliser is now a social enterprise and following a prolonged R&D phase is shifting into commercial production in 2023. Feraliser aims to establish licence agreements with Traditional Owners businesses across Australia to produce high quality fertiliser that supports continuous feral animal management on their country. In this presentation we will illustrate the business model and highlight the potential for supporting consistent feral pig control that is linked to the protection of important environmental and cultural assets.

**Biography**

Dion Creek is the founder of Kalan Enterprises, a successful Traditional Owner business on Cape York Peninsula conducting land management activities, civil works, and other fee for service activities. Dion is the co-chair of Feraliser, CEO of Cape York Land Council and Chair of the Northern Australian Indigenous Land and Sea Management Alliance. Vince Harrigan is the chair of Normanby Aboriginal Corporation and on the Feraliser board and Justin Perry is the research manager at NAILSMA and co-chair of Feraliser.



**Invited Presentation**

4.00pm Tuesday 20 June 2023

**Feral pigs and Mud crabs. A purpose for feral pigs?****B. Cardona<sup>1</sup>**<sup>1</sup>Aboriginal Sea Company, 3/4 Albatross Street Winnellie, Darwin, NT, 0801, Australia**Corresponding author:** Brenton Cardona, [brenton.c@aboriginalseacompany.com.au](mailto:brenton.c@aboriginalseacompany.com.au)**Abstract**

A 2008 High Court decision confirmed the rights of Aboriginal people to control access to tidal waters over their lands in the Northern Territory, known as the “Blue Mud Bay” (BMB) decision.

After extensive negotiations, Traditional Owners proposed the establishment of the Aboriginal Sea Company (ASC) that would be the entity to facilitate the ownership and participation of Aboriginal people in relation to sea country related business interest in the NT.

The ASC will deliver investment opportunities that contributes to creating an enduring legacy for our young people, giving them something to takeover and teaching them the ways of our past to protect their future by capturing all aspects of saltwater country. One of the ways this will be done is from building better relationships with mainstream businesses and government for future ecologically sustainable economic development.

The ASC currently holds 10 commercial mud crab licences in the NT and will acquire an addition licence by the end of 2023. Bait nets are permitted to be used to collect fish for crab bait. Currently, for the 10 Mud crab licences that the ASC own, approximately 1200kg of chicken is being supplied to the operators per week. Aboriginal Sea Company would like to improve the sustainability of its operations and practices in the mud crab industry to limit the impact of localized depletion of aquatic resources and to lower potential interactions with Threatened, Endangered and Protected Species (TEPS) species.

The ASC in conjunction with NAILSMA would like to undertake a strategic partnership / ‘pilot’ project that would utilise feral animal meat as crab bait. This would support small businesses in remote communities for bait supply while controlling feral animal populations including feral pigs, buffalo, donkey and horse.

The benefits that can be achieved by the program could see a reduction in localised depletion of fisheries resources from the use of bait nets, contributing to the management of feral animals and provide small business opportunities and ongoing employment to mob on Country. The project could also see the potential to build participants and rangers capabilities to be trained to collect blood samples for disease monitoring regimes across remote parts and assist with biosecurity monitoring of feral animals. Depending on further investigations and outcomes of a pilot project may see a need to subsidise the supply of feral animal meat to make it a viable business.

**Biography**

Brenton Cardona born and bred in Darwin from multicultural family. Grand-Mother side Iwadja Muran Clan/ Mabuiag, Torres Strait, Wagedagam Clan. Grand-Father side Malak Malak/ Kungarakan.

Originally from a commercial fishing family Brenton started learning at a young age from his father and uncle in commercial Barramundi, Mud Crab and Coastal line fishing. Brenton is also complemented with over 20 years’ experience in Indigenous education training and development. Spent 10 years in Northern Territory government at the NT Fisheries as a fishing mentor, training coordinator, ranger coordinator, resource management and communications.

My focus area that I value the most in my work is to share the knowledge I have gained to assist growth of Aboriginal and Torres Strait Islander peoples in communities to create viable economic growth and development as it would give true meaning and value to self-determination for communities and individuals. I have always been committed to achieving positive outcomes for Aboriginal Torres Strait Islander and non ATSI peoples.



**Oral Presentation**

4.15pm Tuesday 20 June 2023

**Aerial Feral Animal Management - Capacity Building of Indigenous Land and Environment Rangers****D. Armstrong<sup>1</sup>** and M. Hogno<sup>1</sup><sup>1</sup>Carpentaria Land Council Aboriginal Corporation, 11 Wurrup Street, Normanton, QLD 4890, Australia**Corresponding author:** Mark Hogno, [mhogno@clcac.com.au](mailto:mhogno@clcac.com.au)**Abstract**

Carpentaria Land Council Aboriginal Corporation (CLCAC) recognises the importance of Indigenous Rangers having a well-rounded capacity to deliver work independently on country. The CLCAC Land and Environment Program has a well-established feral animal management program which includes fee for service on ground management through 1080 baiting and on ground and aerial management using firearms. The program builds the capacity of the Rangers to deliver this work independently, increasing their self-sufficiency to deliver consistent long-term feral animal management outcomes.

Rangers are selected over a period of 18 months using a rigorous process of evaluation which takes into consideration Ranger aspirations, dedication to work and training programs, aptitude, and work performance. Rangers that are selected and work within the feral animal management program are trained in one or more of the following: 1080 baiting, firearms training, fixed-wing aerial surveys, monitoring and evaluation, and aerial management. The program is a tiered program of capacity building where the Rangers are trained from the bottom up, and skilled Rangers are integrated into the delivery of the training program, project, and data management.

This presentation will discuss the training program, the current capacity of the CLCAC Land and Environment Program to deliver pest animal management and the benefits the capacity building provides for the Rangers by providing a Ranger aspiration directed career pathway.

**Biography**

Desmond Armstrong is the Gangalidda and Garawa Ranger Coordinator and a proud Gangalidda Man. Throughout his extensive career with the Carpentaria Land Council Aboriginal Corporation he has been trained in aerial feral animal management. These skills combined with his existing Land and Environment experience enables Desmond to play an important role in delivery of the CLCAC Land and Environment Aerial Feral Animal Management Program. Desmond is currently developing into a leadership role to support Rangers in their firearms training.





**Oral Presentation**

4.30pm Tuesday 20 June 2023

**Cross-tenure landscape scale invasive species threat management across the World Heritage listed Budj Bim Cultural Landscape****S. Walsh-Bannan**<sup>1</sup>, A. Morgan<sup>1</sup> and P. Raine<sup>2</sup><sup>1</sup> Gunditj Mirring Traditional Owners Aboriginal Corporation, 248 Condah Estate Road, Breakaway Creek, Vic 3303, Australia<sup>2</sup> Department of Energy, Environment and Climate Action, 703-709 Raglan Parade, Warrnambool, Victoria 3280, Australia**Corresponding author:** Pru Raine, [pru.raine@delwp.vic.gov.au](mailto:pru.raine@delwp.vic.gov.au)**Abstract**

Feral pig numbers in Far South West Victoria have been increasing over the last few years with a notable increase since the 2019/2020 bushfires. In response, Gunditj Mirring Traditional Owner Aboriginal Corporation (GMTOAC) and Winda Mara Aboriginal Corporation (WMAC) in partnership with the Department of Energy, Environment and Climate Action (DEECA), are implementing an integrated invasive species control program targeting feral pigs as well as deer and weeds within the Budj Bim World Heritage Cultural Landscape. The Budj Bim cultural landscape is made up of the Budj Bim National Park and adjacent Gunditjmarra owned 'Indigenous Protected Areas' (IPAs).

The potential impact on the precious World Heritage listed landscape as well as vulnerable flora and fauna is significant, with adult feral pigs capable of digging up and moving rocks and damaging the stone structures that have existed on this site for over 6000 years. World Heritage Rangers therefore work tirelessly to remove pigs and protect culturally and environmentally significant sites. Several hundred feral pigs have been removed over the duration of the project as the project team have increased their knowledge and understanding of feral pig controls. The feral pigs are targeted through free feeding in areas showing evidence of rooting and wallowing to encourage them into remote activated Jaeger traps and HOGGONE bait stations.

Other project activities include implementing a Judas pig tracking program to understand feral pig movements, engagement with community to increase understanding and ensure a collaborative approach to feral pig management, partnership with adjacent landholders to support feral pig management on private land and knowledge sharing workshops with similar invasive species project teams.

**Biography**

Sammy Walsh-Bannan is a Budj Bim World Heritage Ranger and Aaron Morgan is the acting World Heritage Executive Officer both at Gunditj Mirring Traditional Owners Aboriginal Corporation whose duties including working to control feral pigs within the landscape in a culturally sensitive manner.

Pru Raine is a Biodiversity Recovery Project Officer working at the Department of Energy, Environment and Climate Action providing project management support to GMTOAC while considering cultural landscape values and Traditional Owner aspirations for Country.



**Oral Presentation**

4.40pm Tuesday 20 June 2023

**The Western Cape Turtle Threat Abatement Alliance (WCTTAA). Indigenous ranger groups reducing pig predation on turtle nests and monitoring the results**T. Eastoe<sup>1</sup>, C. Gill<sup>2,3</sup> and M. Fischer<sup>1</sup><sup>1</sup> Cape York NRM, 63 Anderson Street, Cairns, QLD, 4870, Australia.<sup>2</sup> Western Cape Turtle Threat Abatement Alliance (WCTTAA) Cape York, QLD, 4870, Australia<sup>3</sup> Napranum Aboriginal Shire Council, 320 Wa Tyne St, Mission River QLD 4874, Australia**Corresponding author:** Toby Eastoe, [toby.eastoe@capeyorknrm.com.au](mailto:toby.eastoe@capeyorknrm.com.au)**Abstract**

The Western Cape Turtle Threat Abatement Alliance (WCTTAA) is a partnership of 5 Indigenous Local Governments and one Indigenous organisation including Northern Peninsula Area Regional Council, Mapoon Aboriginal Shire Council, Napranum Aboriginal Shire Council, Kowanyama Aboriginal Shire Council and Pormpuraaw Aboriginal Shire Council and APN Cape York who lead the decision making with support from Cape York NRM. These Indigenous land and sea rangers on western Cape York have been working together in marine turtle conservation since 2014. Supported by Cape York NRM, the work involves feral pig control along the western coast to protect turtle nesting sites on the beaches. Feral pigs are controlled mainly by helicopter culls before and after turtle nesting seasons. The number of pigs controlled are recorded but impact monitoring is the main priority with rangers monitoring predation on nests for the entire nesting season on the beaches they patrol. The program has successfully reduced predation from close to 100% to below 30% on most beaches allowing tens of thousands more turtle hatchlings to reach the sea. This presentation will discuss the history of WCTTAA, its successes and its challenges.

**Biography**

The Western Cape Turtle Threat Abatement Alliance (WCTTAA) has been working together for 14 years as a partnership working towards turtle conservation in Western Cape York. It is a partnership of 5 Indigenous Local Governments and one Indigenous organisation including Northern Peninsula Area Regional Council, Mapoon Aboriginal Shire Council, Napranum Aboriginal Shire Council, Kowanyama Aboriginal Shire Council and Pormpuraaw Aboriginal Shire Council and APN Cape York with support from Cape York NRM.



**Invited Presentation**

8.30am Wednesday 21 June 2023

**Long range drone monitoring of feral pig populations and impact assessment at landscape scales****R. Bartolo**

Department of Climate Change, Energy, the Environment and Water, 3 Pedersen Rd, Eaton, NT 0820

**Corresponding author:** Renee Bartolo, [renee.bartolo@dcceew.gov.au](mailto:renee.bartolo@dcceew.gov.au)**Abstract**

This presentation will provide an overview of current work being undertaken by the Department of Climate Change, Energy, the Environment and Water and Kakadu National Park to trial long range drones for estimating feral pig and buffalo populations and mapping landscape scale impacts at very high resolution. The long-range drone being trialled is capable of 12 hours flight duration with a range of 130 kms before a handoff is required to increase the range. The following themes will be highlighted:

- Why long range drones (Group 2+) for feral pig management?
- Operational science outcomes and potential on ground management actions expected from very high-resolution landscape images.
- How we work: connecting with stakeholders and reducing duplication of effort.
- Moving forward as a collective to realise effective monitoring and management of feral pigs.

**Biography**

Dr Renee Bartolo is a Principal Research Scientist and Chief Remote Pilot for the Australian Government's Department of Climate Change, Energy, the Environment and Water. She currently leads the Office of the Chief Remote Pilot who work with the many diverse groups across the Department to provide capability to undertake cross-cutting operational science and innovation using drones, with drone operations spanning from Antarctica to Kakadu National Park. The team's current focus is on trialling long range drones (Group 2+) to capture imagery at large spatial scales for a range of environmental monitoring applications, and the development of real-time Edge AI applications for drone data and applied science. Renee was a Fulbright Scholar in 2019, is a Board Director for the Australian Association for Uncrewed Systems (and Chair of the Diversity & Inclusion Working Group) and is currently participating in the Australian Rural Leadership Program.



**Invited Presentation**

8.50am Wednesday 21 June 2023

**A brief overview of how to develop a successful Feral Animal Aerial Shooting Program****B. Fuller**

Whitsunday Regional Council, 83-85 Main Street, Proserpine, 4800, Australia

**Corresponding author:** Bren Fuller, [bren.fuller@whitsundayrc.qld.gov.au](mailto:bren.fuller@whitsundayrc.qld.gov.au)**Abstract**

Many areas around Australia undertake aerial feral animal control operations. In most situations, helicopters are the preferred aircraft used to conduct the aerial culling operations. However, the development and implementation of an aerial feral animal control program can be a complex and time-consuming process to be legally right, socially acceptable and have accountable on-ground outcomes.

The author has conducted a review of aerial shooting operations and has compiled a summary of what procedures, processes and workflows are needed to support a successful aerial shooting program. Some of the more important broad factors to consider when developing and implementing an aerial shooting program include:

- Aircraft selection
- Marksman selection and pilot selection
- What pre-shoot planning is needed to ensure success
- What data to collect and report upon
- Stakeholder engagement
- How important is communication
- Funding and budgeting.

The review of Aerial Shooting Programs has enabled the compilation of a series of factors which could be regarded as aerial shooting best practise guidelines. The contents of this review report can be used as a guide to the development of Aerial Shooting Programs which have a greater chance of being socially and politically supported and attractive for potential funding agencies.

**Biography**

Bren started his involvement in feral animal control in the mid-1990's in Arnhem land and Gove in the Northern territory. In 2006 Bren moved back to the Whitsundays to take up a role with the Whitsunday Regional Council as a Land Protection Officer with a focus on feral animal control and weed management. Over the last 17 years, Bren has assisted the Whitsunday Council to develop a dedicated Feral Animal Control Program with aerial shooting being added in 2012. Bren is also a keen recreational shooter and is a member of the Bowen SSAA Club.



**Oral Presentation**

9.05am Wednesday 21 June 2023

**Broadscale feral pig control; an uphill battle****S. Dawson<sup>1</sup>**, P. Adams<sup>1</sup>, M. Jansen<sup>2</sup>, T. Kreplins<sup>3</sup>, M. Zabek<sup>1</sup><sup>1</sup> Department of Primary Industries and Regional Development, 3 Baron-Hay Court, South Perth, WA, 6151, Australia<sup>2</sup> Northern Biosecurity Group, PO Box 33, Northampton, WA, 6535, Australia<sup>3</sup> Department of Primary Industries and Regional Development, 75 York Rd, Northam, WA, 6401, Australia**Corresponding author:** Stuart Dawson, [stuart.dawson@dpird.wa.gov.au](mailto:stuart.dawson@dpird.wa.gov.au)**Abstract**

Feral pigs damage environmental and agricultural assets, present a significant disease risk, and have a range of social and cultural impacts in many regions throughout Australia. The northern agricultural zone of WA experiences some of the highest densities of feral pigs in Western Australia, where they dig up and disturb native vegetation, foul waterways, and dams, consume and trample crops, predate livestock, and damage fences. Since 2018, feral pigs have been controlled using an annual aerial shoot and trapping. Shot pigs were sampled each year to investigate impacts of control on the demographics of the population and diet. The population of feral pigs is heavily driven by food availability, with populations responding rapidly to productive years with high food availability. More than 95% of food within stomachs of sampled pigs was representative of crops grown in the area, mainly wheat, lupin and canola. Of the 1234 culled pigs sampled, 59% of sexually mature females were pregnant, with an average of 4.9 young. In total, 52% of sampled pigs were 6 months old or younger. We explore trends in the demographic of this highly persecuted population and explore the factors that have resulted in high feral pig density under significant control effort. Despite 6 years of concerted broadscale control effort, there is little evidence that current control effort has caused a meaningful reduction in feral pig distribution. We conclude that effective feral pig control must be carried out year-round, and while annual bouts of intensive control (such as aerial shooting) may be highly effective in the short term, they are insufficient to achieve lasting control.

**Biography**

Stuart Dawson is a wildlife management scientist with the Department of Primary Industries and Regional Development, working primarily on feral pigs and deer. Stuart has more than 10 years of experience in research and industry. Stuart has conducted research on management of wild dogs, kangaroos, and feral cats, as well as conservation of bilbies, freshwater turtles, and landscape management in the savannah of northern Australia.



**Oral Presentation**

9.15am Wednesday 21 June 2023

**Optimising bait transect placement for feral pig control****C. Wilson<sup>1</sup>**, M. Gentle<sup>2</sup> and D. Marshall<sup>3</sup>

<sup>1</sup> Animal Biosecurity and Welfare, Biosecurity Queensland, Department of Agriculture and Fisheries, 16 – 32 Enterprise Street, Bundaberg, Queensland, 4670, Australia

<sup>2</sup> Invasive Plants and Animals Research, Biosecurity Queensland, Department of Agriculture and Fisheries, 203 Tor Streety, Toowoomba, Queensland, 4350, Australia

<sup>3</sup> Southern Queensland Landscapes, 266 Margaret St, Toowoomba, QLD 4350, Australia

**Corresponding author:** Cameron Wilson, [cameron.wilson@daf.qld.gov.au](mailto:cameron.wilson@daf.qld.gov.au)

**Abstract**

Throughout Australia, poison baiting is a widespread practice used to control invasive species, often serving as the primary method for their management across a range of situations and environmental conditions. Although baiting is commonly perceived as an effective tool for controlling feral pigs, successful baiting is reliant upon many factors. The ecology and behaviour of feral pigs, local dietary preferences, environmental influences like food availability and factors including bait attractiveness, palatability and availability may all affect the outcomes from baiting campaigns. Increasing the amount of bait distributed to improve bait encounter and interaction rates is often considered the key means to increase the effectiveness of control. However, simply increasing the amount of bait distributed can be a costly and wasteful approach with potential negative impacts. Refinements to improve the placement of baits to maximise the encounter rates by feral pigs are also needed.

This collaborative project between the Department of Agriculture and Fisheries and Southern Queensland Landscapes aims to use identified home and core ranges of feral pigs to compare the effectiveness and efficiency of simulated baiting strategies using meat baits, as widely undertaken in Queensland. Comparing simulations of systematically placed and watercourse-based aerial transects, and ground transects aligned with farm track and property boundaries, we discuss the factors influencing the proportions of these transects falling within activity ranges of feral pigs. Study limitations and future research required is also discussed.

**Biography**

Cameron Wilson is a Scientist with the African swine fever prevention and preparedness project, Biosecurity Queensland in Bundaberg. After completing his Bachelor of Applied Science at UQ, he began working for DAF in both research and operational capacities. After completing his honours degree on feral cats in 2020, Cameron gained a research position investigating the spatial ecology of feral pigs and how we can apply those findings to improve pest management both inside and outside of emergency animal diseases responses.



**Oral Presentation**

9.25am Wednesday 21 June 2023

**Enhancing the effectiveness of feral pig control and monitoring in Queensland agricultural lands****M. Gentle<sup>1</sup>, L. Harriott<sup>1</sup>, C. Kelly<sup>1</sup>, C. Wilson<sup>2</sup>, A. Sydenham<sup>3</sup>, B. Fuller<sup>4</sup>, C. Gaschk<sup>5</sup> and D. Marshall<sup>3</sup>**

<sup>1</sup> Invasive Plants and Animals Research, Biosecurity Queensland, Department of Agriculture and Fisheries, 203 Tor Street, Toowoomba QLD 4350, Australia

<sup>2</sup> Animal Biosecurity and Welfare, Biosecurity Queensland, Department of Agriculture and Fisheries, 16-32 Enterprise Street, Bundaberg QLD 4670, Australia

<sup>3</sup> Southern Queensland Landscapes, 266 Margaret St, Toowoomba, QLD 4350, Australia

<sup>4</sup> Whitsunday Regional Council, 83 Main St, Proserpine QLD 4800, Australia

<sup>5</sup> Western Downs Regional Council, 30 Marble Street, Dalby QLD 4405

**Corresponding author:** Matthew Gentle, [matthew.gentle@daf.qld.gov.au](mailto:matthew.gentle@daf.qld.gov.au)

**Abstract**

Feral pigs (*Sus scrofa*) are widely distributed throughout Queensland and are managed primarily to reduce their impacts to agriculture and the environment. The effectiveness of feral pig management programs is often hampered due to inadequate levels of population reduction, compounded by a lack of coordination of efforts in time and space. While a variety of control tools are available, strategies for their optimal application are lacking or require field-testing. There is a compelling need for optimised control and monitoring practices supported by science-based information to better inform end-users.

This collaborative project between state and local government, and natural resource and land managers, aims to improve the capacity for effective management of feral pigs through refining and testing optimised control and monitoring practices. Feral pig population size is being monitored on two sites in northern Australia agricultural lands (Westmar in southern Queensland, and Collinsville in northern Queensland) prior and in response to pig control (aerial shooting). Monitoring techniques being tested to determine feral pig population size and trends include aerial surveys with visual observers, aerial surveys with thermal camera, and camera trap surveys. The offtake, effort and costs from aerial shooting (and other control) is compared with the density estimates from the monitoring surveys to calculate the proportion of the population removed, harvest rates. At Westmar, the movements and mortality of GPS- collared feral pigs is also being monitored to examine habitat use, control outcomes, and whether intensive control influences pig movements. These data are being compared to mapped habitat preferences for feral pigs from ecological and modelling studies to assess their application to guide control programs.

This presentation discusses the importance of the information sought, the range of approaches tested, and the results of the project to date.

**Biography**

Matt Gentle is a Principal Scientist with the Pest Animal Research Centre, Biosecurity Qld in Toowoomba. After studying at the University of Queensland, Matt started his career at the New South Wales DPI Vertebrate Pest Research Unit and subsequently completed his PhD with the University of Sydney. His career has focused on investigating the impacts and improving the effectiveness and safety of managing vertebrate pests, including foxes, wild dogs, feral cats, and feral pigs.



**Oral Presentation**

9.35am Wednesday 21 June 2023

**Thermal Aerial Surveillance Considerations for feral pig monitoring in Western Riverina NSW****S. Holbery**<sup>1</sup>, A. Bengsen<sup>2</sup>, M. Leane<sup>3</sup>,<sup>1</sup> NSW Local Land Services, Lachlan Street, Hay, NSW, 2711, Australia<sup>2</sup> NSW Department of Primary Industries - Vertebrate Pest Research Unit, Marsden Park Road, Calala, NSW, 2340, Australia<sup>3</sup> NSW Local Land Services, Sheridan Street, Gundagai, NSW, 2722, Australia**Corresponding author:** Suzie Holbery, [suzie.holbery@lls.nsw.gov.au](mailto:suzie.holbery@lls.nsw.gov.au)**Abstract**

This discussion piece is focused on the lessons learned from six years of conducting annual thermal aerial surveys for feral pigs in the Western Riverina Pest Program (WRPP) area. The WRPP began in 2016 with a thermal aerial survey for the purpose of measuring an indicative feral pig density base line. At the time thermal surveying was not widely adopted for feral pig monitoring and the methodology the WRPP employed was based on expert recommendations as opposed to tested techniques. The consistent parameters of the WRPP survey methodology was a single thermal camera mounted to a helicopter, travelling at 30 to 50 knots and a height of about 272 feet (83 m). Transects were flown east-west at 5 km spacings over a subset of 30 contiguous 10 x 10 km blocks each year from 2016 to 2020. An independent review by the NSW Department of Primary Industries Vertebrate Pest Research Unit, as well as internal evaluation of the WRPP survey methods, identified the following priorities for survey design:

- 1) include locations where the highest density of pigs is predicted to occur
- 2) aim for a combination of thermal sensor, survey height and flight speed that optimises quality imagery and reduces unclassified detections
- 3) decide on an analysis method that is repeatable and provides the most accurate indication of population density
- 4) consider how improvements to technology could impact the comparability of results long term
- 5) plan for what is realistically achievable long term
- 6) for long term monitoring programs, aim to collect survey data from years of differing seasonal conditions.

Whilst thermal surveys offer a higher probability of detecting animals, there are limitations in accurately identifying the species. Selecting a transparent and repeatable analysis method is an essential measure for reporting an indicator of relative population density. The WRPP intends to refine its survey methodology in line with recommendations and the lessons learned from six years of annual surveying. This information could then be published as a standard operating procedure, capable of guiding other projects with their survey design.

**Biography**

Suzie is a Senior Biosecurity Officer for Riverina Local Land Services since 2015. She is predominantly working as the Program Coordinator for the Western Riverina Pest Program and the southeast Hay rabbit management program. Suzie came to Local Land Services following a career in agricultural research for various interstate departments.





**Oral Presentation**

9.45am Wednesday 21 June 2023

**Ellerslie Proof of Concept Eradication Project. How close can we get to eradication at a locality and what is required? A comparison of aerial control techniques****R. Baker**

Riverina Local Land Services, 64 Fitzroy Street, Tumut NSW 2720 Australia

**Corresponding author:** Rod Baker, [rod.baker@lls.nsw.gov.au](mailto:rod.baker@lls.nsw.gov.au)**Abstract**

As part of a state-wide Foot and Mouth Disease prevention and preparedness project during 2022/23, Local Land Services undertook extensive pest control programs across NSW. As a component of this, LLS Regions were tasked with investigating, designing, and implementing proof of concept eradication programs to review and practice the operational requirements of an FMD response scenario. The programs tested how a subsequent localised pest eradication program would be undertaken if FMD were to occur at a locality to remove all susceptible cloven-footed pests (pigs, deer and goats) within a defined area.

Riverina LLS Region selected a 22,000-hectare site west of Adelong NSW, a locality known as Ellerslie. In consultation with the NSW Department of Primary Industries Vertebrate Pest Research Unit, a project was designed. An aerial thermal survey was undertaken across the site to estimate initial pest animal abundance. Following the survey, two aerial control programs were undertaken. One program used standard practice search techniques, with pests located by flying to assumed habitat areas and sought visually by pilot, navigator, and shooter. The second involved an intensive aerial shoot flying transects at 500m spacings systematically across the site and with a thermal camera to assist in locating pest animals.

Control results were compared against the initial population estimates. No pigs were detected in the initial survey however 69 were removed or sighted in the following control programs. Initial survey detection estimated the goat population at  $239 \pm 135$  individuals. 336 goats were removed or sighted during the subsequent control programs. Initial survey detection estimated the deer population at  $66 \pm 25$  individuals. 20 deer (Sambar) were removed or sighted during the subsequent control programs. Deer were almost always detected with help of the thermal camera. Pests were located on transects on occasion in unexpected locations.

Constraints and limitations to the overall effectiveness of the project included animal migration, non-consenting landholders, aircraft availability and timing, and weather impacting ability to use thermal camera.

**Biography**

Rod Baker is the Regional Pest Animal Coordinator for Riverina Local Land Services based in Tumut NSW. He has been with Local Land Services for five years and prior to that worked in Forestry for 20 years specialising in pest, weed and fire management.



**Oral Presentation**

9.55am Wednesday 21 June 2023

**An effective feral pig control program: Piccaninny Plains, Cape York, 2014 - 2023**G. Woods and **S. Gray**

Piccaninny Plains Wildlife Sanctuary, Australian Wildlife Conservancy, Cape York Queensland

**Corresponding author:** Sally Gray, [Sally.Gray@australianwildlife.org](mailto:Sally.Gray@australianwildlife.org)**Abstract**

Since 2014 Graham Woods and the Australian Wildlife Conservancy (AWC) have been delivering an effective, efficient, economical, and humane feral pig control program on Piccaninny Plains Wildlife Sanctuary in northern Cape York. The program has dramatically reduced feral pig numbers across 176,000ha to a manageable, low impact level. The reduction in feral pig numbers has removed pressures on country, enabling regeneration and landscape transformation.

With more than 70 wetlands and lagoons of national significance on the property, plus the Archer River and floodplain and Wenlock River, Piccaninny Plains is a feral pig magnet. A legacy of a commercial feral pig hunting operation in the decade preceding purchase of the property by AWC had also encouraged the proliferation of the feral pig population that was having an ever-increasing impact on high ecological value (HEV) country.

Piccaninny Plains is largely inaccessible on-ground for up to 6 months of the year due to wet season inundation. This renders ground control methods such as shooting and trapping as unrealistic and unworkable.

Given by-kill data suggest significant off-target impacts, Graham and Sally had a firm held conviction that baiting was neither appropriate or humane on Piccaninny Plains. With 1080 baiting programs continuing across large areas of Cape York, to curtail baiting was largely considered imprudent. In order to validate the cessation of baiting deployment, a trial was run to measure the local effectiveness of baits reaching the target species. Results of this trial indicated that baits reached monitors, raptors, dingoes in far greater numbers than baits reached feral pigs.

With conditions so favourable on Piccaninny Plains to feral pig reproduction, the frequency of targeted control is key to staying ahead of the breeding cycle of the local pig population.

Since 2014, Graham has undertaken 10 annual aerial feral pig control operations resulting in dramatic reductions in the overall feral pig population and a recovery of HEV country. The high intensity control operations have removed the legacy populations of feral pigs that carried generational knowledge of country through the pig populations.

Today, control operations may sometimes result in relatively high numbers of feral pigs killed in each operation, however most are incursions from neighbouring country and appear within 5-10 km of the property boundaries.

The delivery of this aerial feral pig control program demonstrates that effective and efficient control is possible across large parcels of country in high biosecurity risk regions with a minimal labour force working within modest budgets.

**Biography**

Graham Woods and Sally Gray have been managing Piccaninny Plains Wildlife Sanctuary for the not-for-profit Australian Wildlife Conservancy since 2013.

Graham comes from a cattle background, working on some of Queensland largest properties. He believes the essentials of managing country for cattle is not unlike care of country for wildlife; manage fire, reduce impacts from feral species, and protect water. He is passionate about preserving our last wild places.

Sally has worked in conservation land management throughout eastern Australia and the USA. She is also Chair of Cape York NRM. Foundational to all is a passion for conservation filmmaking and photography.



Invited Presentation

10.45am Wednesday 21 June 2023

**The human dimensions of controlling and managing feral pigs.**

**D. Marshall<sup>1</sup>, T. Alter<sup>2,3</sup>, M. Gentle<sup>4</sup>, G. Ballard<sup>3,5</sup> and P. Martin<sup>3</sup>**

<sup>1</sup> Southern Queensland Landscapes, 266 Margaret St, Toowoomba, QLD 4350, Australia.

<sup>2</sup> Penn State University, 204 Armsby Building, University Park, Pennsylvania 16802, USA.

<sup>3</sup> University of New England, Armidale, NSW, 2351, Australia.

<sup>4</sup> Pest Animal Research Centre, Biosecurity Queensland, Department of Agriculture and Fisheries, 203 Tor Street, Toowoomba, QLD 4350, Australia.

<sup>5</sup> Vertebrate Pest Research Unit, NSW Department of Primary Industries, Armidale, NSW, 2350, Australia.

**Corresponding author:** Darren Marshall, [darren.marshall@sqlandscapes.org.au](mailto:darren.marshall@sqlandscapes.org.au)

**Abstract**

Significant advances have been made in the biophysical sciences to improve our knowledge of feral pig (*Sus scrofa*) ecology in Australia. Similarly, new management tools are being developed based on these advances to help people manage feral pig populations and their damaging impacts. Despite these developments, landscape-scale management of feral pigs and their impacts is hampered by limited collective participation of land managers in applying control strategies. Without coordinated collective commitment and participation from land managers in engaging what is in effect a common property resource issue, feral pig control strategies will be largely sub-optimal.

We explore the insight that managing feral pigs is not exclusively a biophysical ecological science issue and acknowledge that feral pig management is equally a human ecology issue. We acknowledge the importance of both ecological sciences and the insights they provide, however utilising each in isolation is not sufficient. Addressing the wicked feral pig problem in these ecological 'silos' has not effectively progressed or improved the management of feral pigs across the Australian landscape. Combining and integrating insights from these two 'silos' may provide a motivating and catalysing force uniting land managers to work together, implement relevant control tools effectively, and, in turn, reduce feral pig populations and the damage they cause.

To strengthen our understanding of feral pig management, this project looks at the value of bridging the gap between biophysical and human ecology research. Other presentations at this conference have discussed findings from the biophysical ecology perspective of our project. The purpose of the human dimension component is to test an innovative 'thick' engagement approach, incorporating intense interactions and involvement with land managers and other community members to strengthen collective, community-wide capacity for controlling and managing feral pigs at landscape scale. We test different engagement treatments over six study sites and use a mixed-methods study approach to examine how effective these engagement strategies work.

In this presentation, we present preliminary research findings regarding the integration of cutting-edge biophysical ecological sciences with a better understanding of community dynamics grounded in human ecological sciences. The intersection of these two ecologies affords an opportunity for greater participation, increased learning and understanding, and local innovation in feral pig management.

**Biography**

Darren Marshall is a specialist in engaging people in effective, coordinated pest animal control and landscape scale environmental management. Darren is currently the Lead of the Vertebrate Pest and Wildlife Management team with Southern Queensland Landscapes. He is completing a PhD, testing different engagement strategies, using biophysical research as a vehicle to motivate land managers to take collective action to address the feral pig issue in Australia. This study is part of a collaboration with the University of New England and Penn State University (USA). Darren's interests lie in improving environmental management through working with land managers to tackle issues that can only be addressed at a landscape scale, particularly linking good research and effective local engagement with on-ground outcomes.



Invited Presentation

11.10am Wednesday 21 June 2023

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**Kangaroo Island feral pig eradication – making the most from a natural disaster, merging local knowledge with novel techniques**

**M. Korcz**

Department of Primary Industries and Regions South Australia, PO Box 115, Kingscote, SA, 5223 Australia

**Corresponding author:** Matt Korcz, [matt.korcz@sa.gov.au](mailto:matt.korcz@sa.gov.au)

**Abstract:**

Feral pigs have infested Kangaroo Island (KI) for hundreds of years; in particular, they have thrived across the western half of KI, where plentiful water and thick scrub provided ideal habitat. The devastating 2019/20 bushfires had immense impacts on the local communities and businesses of KI. They also devastated vast areas of vegetation across western KI, and the resident feral pig population. The silver lining that emerged from the fires was the unique opportunity to act to eradicate feral pigs altogether from KI.

An eradication program was designed to benefit from historical knowledge of feral pigs from local natural resources staff as well as from advanced and novel control techniques. A network of local project staff worked together on new community engagement initiatives to ensure the tight-knit KI community was well informed with the program and its progress. This approach ensured strong community support across the entire program area, an essential requirement for eradication.

Since 2020, the KI Feral Pig Eradication Program has destroyed 873 feral pigs, and the island is now approaching eradication. Control tools such as sodium nitrite poison baits, remote activation traps, an artificial intelligence-assisted camera network, thermal assisted ground shooting, and thermal assisted aerial culling were the most effective tools for targeting feral pigs. The ability to deploy a combination of these tested effective tools ensured that feral pigs were culled under a variety of dynamic conditions and scenarios.

Prior to the KI Feral Pig Eradication Project, thermal assisted aerial culling was an unproven control tool. On KI this new technique proved to be an effective and efficient tool for detecting and humanely culling feral pigs, even in dense foliage recovering after fire. Thermal culling is an exciting new tool that has now been added to the suite of control tools for feral pigs and other pests, such as feral deer in South Australia. The final tool to ensure KI stays free of feral pigs is changing legislation to ensure that domestic pigs are kept in secure enclosures under a permit system.

A multi-pronged approach that combines opportunity, community support, historic knowledge, novel technologies, and policy reform provides a generational outcome in the sustained eradication of feral pigs from Kangaroo Island.

**Biography**

Matt Korcz is the Kangaroo Island Feral Pig Control Coordinator for The Department of Primary Industries and Regions South Australia (PIRSA). He received a bachelor's degree in agriculture science from Adelaide University. In his current role he coordinates the Kangaroo Island Feral Pig Eradication working with project partners, stakeholders and the local community to ensure the eradications success.



## Oral Presentation

11.30am Wednesday 21 June 2023

### How can we better engage *Homo sapiens* to manage *Sus scrofa*?

#### J. Cuskelly

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**Corresponding author:** John Cuskelly, [John.cuskelly@daf.qld.gov.au](mailto:John.cuskelly@daf.qld.gov.au)

#### Abstract

Feral pigs have been a declared pest in Queensland since the 1930s - and yet as feral pig management facilitators and practitioners, we still often struggle to engage landholders to actively control pigs.

Even last year, with great community concern about Foot and Mouth Disease in neighbouring countries, many of our graziers were still asking “What is the government going to do to control the feral pigs on my land?”

So how do we get these integral stakeholders to take on ownership and to proactively manage pigs?

Queensland’s local government and natural resource officers have an excellent practical knowledge and understanding of feral pig management in their areas. To capitalise on this, over the next 12 months Biosecurity Queensland will be looking to partner with these organisations to help equip these officers with enhanced knowledge and skills in engaging landholders – developing their skills in **transferring** their practical knowledge of feral pig control to the people who most need it, landholders.

To do this, we need to look at our knowledge of feral pigs and consider how we can break it down into ‘bite size’ chunks of information that means something to landholders – and how to best communicate those ‘chunks.’ When we talk of our control tools, we need to be able to simply articulate how those tools exploit pig ecology and lead to success.

My discussion of this theme will not be about feral pig science, but about how we as facilitators and practitioners might transfer the **application** of science in simple terms to the grassroots landholder audience. The feedback from this presentation and ongoing discussions will function as a guide to how we achieve this.

#### Biography

John Cuskelly is a Principal Project Officer, based in Dalby, with Biosecurity Queensland’s African swine fever prevention and preparedness project. John works in the area of strategic feral pig management.

Since studying at the University of Queensland’s Gatton College, John has worked in the field of biosecurity for thirty years, based in Western and Southern Queensland. For the past fourteen years John has specialised in community engagement, in the field of vertebrate pest management.

John has always liked the line - ‘The answers to biosecurity risks are inherently social’.



Oral Presentation

11.40am Wednesday 21 June 2023

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**Active and passive stakeholder engagement in feral pig management in complex environments**

**R. Madácsi**

Shire of Toodyay, Fiennes Street, Toodyay, WA, 6566, Australia

**Corresponding author:** Rosemary Madácsi, [cr.madacsi@toodyay.wa.gov.au](mailto:cr.madacsi@toodyay.wa.gov.au)

**Abstract**

Effective communication is the core to collaborative action in effective feral pig management. Identifying the common denominator to achieve strong engagement across a range of diverse stakeholders in a complex environment, is the current challenge. The movement of feral pig intrusion through state forests and remnant vegetation into the periphery of the metropolitan area has challenged the established approach to pig management. The mix of urban and rural lifestyle verses agricultural priorities are at odds with effective management of feral species. Divergent views and objectives hinder collaboration between stakeholders.

A decline in Regional Biosecurity Groups and Landcare District Committees has occurred in many agricultural districts in Western Australia. The interest to resurrect these groups is hindered by the shift from a predominately agrarian community to a strong preurban disposition. Local governments by default in these areas become the focal point to respond to community frustration yet are handicapped by community expectations of entitlement or resistance to government intrusion in collaborative action. In 2021 the Toodyay local government initiated a feral pig management partnership with the community. A feral pig working group of affected landowners and shire personnel was established to strategise feral pig management and collation of data. Initial engagement was successful. Wider engagement failed to attract community support despite a concerted effort. The program is encumbered by activities that arise from the disengaged sector of the community that are detrimental to the program's success. The shire is well placed to ensure a long term coordinated approach in its increasingly complex environment. Necessity requires focus being given to all community stakeholders needs to identify prime incentives to collaborate in a communitywide approach to effective management of the feral pig problem. The demographic complexities and approaches will be examined to provide insight into the significance of full community engagement in effective management.

**Biography**

Rosemary Madácsi has lived extensively across northern Australia and regional WA for forty-five years acquiring a deep interest in the land and its inhabitants. Nursing and later qualifications in environmental science enriched and fed an interest in environmentally driven disease vectors. Rosemary has 8 years' experience in regional local government, four years as Shire President and was instrumental in utilising the Shire's Environmental Advisory Committee to provide an avenue to support a community partnership to address a significant feral pig incursion in Toodyay.



Oral Presentation

11.50am Wednesday 21 June 2023

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**Pigs might fly, lessons learned from Feral pig control in the Queensland Channel country**

**L. Kohler<sup>1</sup>, D. Allpass<sup>2</sup>, P. Spence<sup>3</sup>**

<sup>1</sup> Chief Executive Officer, Desert Channels QLD, 92 Galah Street, Longreach QLD 4730, Australia

<sup>2</sup> Regional Agriculture Landcare Facilitator, Desert Channels QLD, 92 Galah Street, Longreach QLD 4730, Australia

<sup>3</sup> Field Operations Officer, Desert Channels QLD, 92 Galah Street, Longreach QLD 4730, Australia

**Corresponding author:** Leanne Kohler, [ceo@dcq.org.au](mailto:ceo@dcq.org.au)

**Abstract**

Desert Channels Queensland (DCQ) has a long history of conducting control programs on feral pigs within the Western Queensland region and, in particular, in the lower channel country. This presentation will showcase learnings from monitoring programs undertaken both from the air and the ground, which set the foundation of future programs. The learnings are from one of the most successful programs undertaken to date which controlled over 36,000 pigs and reduced numbers to historic lows. How post program control has been maintained in the transition from government funded programs to community and property funded and led activities will also be discussed.

As part of this work DCQ has established and maintained a network of 51 ground monitoring sites to flag changes in feral pig populations. DCQ has also maintained strong relationships with properties in the region, and with very limited financial support, now regularly organise and undertake property-based and cluster-based control. The presentation will focus mainly on the post funded program support required to ensure that programs are fully leveraged and have legacy. Property based programs regularly control over 400 pigs and are now largely funded privately. While the foundations are laid through the funded control programs, ensuring this commitment is maintained requires extension programs to adapt to an environment where external funding assistance is limited.

**Biography**

Leanne Kohler is the CEO of Desert Channels QLD (DCQ), the natural resource management group operating in western QLD - an area covering one-third of QLD, home to fourteen-thousand people and five bioregions. The organisation has for many years run monitoring and control programs for feral pigs, which is a key species of concern for producers and community across the region. Leanne has been CEO to DCQ for 21 years and brings a lot of corporate knowledge to policy and operational projects being delivered in the region.



Oral Presentation

12.00pm Wednesday 21 June 2023

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**Community Involvement in pest control – an overview of accredited volunteer shooting programs**

**M. Godson** and D. Ferguson

SSAA National, UI&2, 202-208 Glen Osmond Road, Fullarton, SA, 5063, Australia

**Corresponding author:** Matthew Godson, [wildlife@ssaa.org.au](mailto:wildlife@ssaa.org.au)

**Abstract**

Community involvement is often essential to successful pest management. Landholders and other community groups are important resources that many land managers can use to achieve their project goals. So too is the access to a wide variety of pest control tools to cater for different situations. Volunteer hunting, culling, or shooting is one tool that, by itself or in conjunction with other pest control methods, can deliver positive social, economic and environmental outcomes through the removal of pest animals.

The Sporting Shooters' Association of Australia (SSAA) has a proud history of engaging volunteer shooters to use their unique skill set to undertake pest control activities for both conservation and asset protection purposes. The SSAA Conservation and Wildlife Management (CWM) Branch has been in operation since 1992. The efforts of CWM on public land in the Flinders Ranges of South Australia have been a cornerstone in the success of Operation Bounceback (a coordinated pest control program). This project led to the recovery of the Yellow-footed Rock-Wallaby and more recently the reintroduction of the Western Quoll. In Qld, CWM commenced over 20 years ago to help endangered species in and around three National Parks - the Bridled Nail Tailed Wallaby at Taunton National Park, the Yellow Chat on Curtis Island National Park and the Kroombit Tinker Frog in Kroombit Tops National Park. CWM Qld also conducts operations on Bush Heritage and other private conservancy groups' properties and private properties. Many of these private properties adjoin National Parks, where controlling pest animals on these properties helps provides a buffer zone around National Parks.

The recent rollout of the SSAA Farmer Assist program across the country has engaged even more volunteers to assist landholders with pest animal control for both asset protection and environmental reasons. This program offers a unique online portal that allows landholders to seek help from accredited shooters, 24 hours a day, seven days a week. In the past ground shooting was mostly opportunistic, however well-run teams and skilled individuals utilising thermal and night vision equipment can greatly improve the effectiveness of ground shooting. These programs reaffirm the SSAA as a credible and important stakeholder in the management of pest animals in Australia.

**Biography**

Matthew Godson is a wildlife biologist and is the program leader of Wildlife Programs for SSAA National. He is the national coordinator of the SSAA Farmer Assist program and provides ongoing advice to the SSAA's Conservation and Wildlife Management branches. His role includes stakeholder engagement with both federal and state-based agencies and advocacy groups, assisting with the development of policy and programs, undertaking research projects, and contributing to the SSAA's many publications to educate and engage with recreational shooters.





5-minute speed talk

12.10pm Wednesday 21 June 2023

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**Sow much effort, no funding: can Western Australia's feral pig advisory group root out pig control challenges with a voluntary board, while building community capacity and coordination?**

**K. Duzevich<sup>1, 2</sup>**

<sup>1</sup> WA Feral Pig Advisory Group, 18302 South Western Highway, Donnybrook WA 6239

<sup>2</sup> Leschenault Biosecurity Group, 18302 South Western Highway, Donnybrook WA 6239

**Corresponding author:** Kate Duzevich, [kate@lbginc.org.au](mailto:kate@lbginc.org.au)

**Abstract**

The Western Australian Feral Pig Advisory Group (WAFPAG) is a voluntary board of management striving to address the significant challenges posed by feral pig populations in Western Australia. Despite limited resources and no funding, the group has focused on building community capacity and coordinating pig control projects at a state level in its first year.

In WA, feral pig control is undertaken by a wide range of organisations, including government departments, industry groups, Recognised Biosecurity Groups, community groups, conservation agencies, and landholders. By fostering partnerships between these disparate groups, WAFPAG aims to facilitate knowledge exchange and build awareness of feral pig management programs. Through this process, the WAFPAG actively supports training and community workshops to increase stakeholder capacity to deliver effective feral pig control across the State. Additionally, the group aims to drive adoption of a centralised information management system to coordinate data, best practices, and control strategies, promoting informed decision-making and effective pig control initiatives.

Despite the financial constraints, WAFPAG demonstrates resilience by seeking collaborations with government agencies, research institutions, and private enterprises, securing in-kind contributions and technical expertise. These partnerships enhance the group's capacity to tackle feral pig issues, exemplifying effective community-driven initiatives in feral pig management. The WAFPAG's efforts highlight the potential for successful collaboration and coordination in addressing complex environmental challenges. The Group faces an equal number of challenges, including the typical pressures of competing priorities and time commitments that come with a purely volunteer membership. Whilst the group has developed a terms of reference, a governance structure, and accountabilities for the board, it still needs to develop an operational model to deliver on ground support and data collection, and the dissemination of deliverables. The current priority for the group is to seek a sustainable funding source to progress its good work.

**Biography**

Kate Duzevich is the secretary for the WAFPAG and the Executive Officer of Leschenault Biosecurity Group.

WAFPAG has formed out of the WA Department of Primary Industries and Regional Developments Western Australia Feral Pig Strategy 2020-2025 as a means of tackling the linkage of a vast land mass with current gaps in pig management. LBG is a not-for-profit, community organisation providing support to private landholders within their operational area in southwest Western Australia with the management of declared pests. The group is a recognised biosecurity group operating under the WA Biosecurity and Agriculture Management Act 2007. Pigs are currently the most resourced pillar of LBG's operations and the primary focus of WAFPAG to fulfil a resource maximisation role for managing feral pig populations across the state.



**Invited Presentation**

1.15pm Wednesday 21 June 2023

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**Nature Repair Market**

**R. Wilson**

Department of Climate Change, Energy, the Environment and Water (DCCEEW), Canberra ACT, Australia

**Corresponding author:** Ryan Wilson, [Ryan.Wilson@dcceew.gov.au](mailto:Ryan.Wilson@dcceew.gov.au)

**Abstract**

The Nature Repair Market is part of the government's Nature Positive Plan, and will enable landholders who protect, manage, or restore local habitat to receive biodiversity certificates which can then be sold to private and philanthropic investors.

Projects can be on land, inland waterways (including lakes and rivers), or in marine and coastal environments.

Example projects include:

- Controlling feral ungulates / herbivores to prevent coastal floodplain degradation
- Improving or restoring existing native vegetation, through fencing or weeding
- Protecting rare grasslands that provide habitat for endangered species

Dr Ryan Wilson will provide an overview of outcomes of the consultation on the Nature Repair Market Bill 2023 including next steps and opportunities for further consultation.

**Biography**

Dr Ryan Wilson leads the Nature Repair Market team in the Department of Climate Change, Energy, the Environment and Water (DCCEEW). Prior to this Ryan led the development of the Agriculture Biodiversity Stewardship Package, trialling ways to establish a biodiversity market for private landholders. Ryan has held international and domestic policy roles for a number of years in the Department of Agriculture, Fisheries and Forestry. He represented Australia and supported our global engagement on agriculture and food security, through the UN Food and Agriculture Organisation, the G20, OECD and APEC. In domestic policy, Ryan has contributed to food and agriculture industry policy as well as plant health policy and programs with Australian industry sectors. Ryan's volunteering roles have included mentoring and chairing of two not-for-profit boards.



## Invited Presentation

1.35pm Wednesday 21 June 2023

**Carbon abatement and biodiversity enhancements from controlling feral ungulates in wetlands to underpin a new carbon method****V. Hagger<sup>1</sup>**, A. Pearse<sup>1</sup>, N. Santini<sup>1</sup>, S. Bruce<sup>2</sup> and C.E. Lovelock<sup>1</sup><sup>1</sup> School of Biological Sciences, The University of Queensland, St Lucia, QLD 4072<sup>2</sup> Queensland Alliance for Agriculture and Food Innovation, The University of Queensland, St Lucia, QLD 4072**Corresponding author:** Valerie Hagger, [v.hagger@uq.edu.au](mailto:v.hagger@uq.edu.au)**Abstract**

Feral ungulates (e.g., pigs, buffalo, and cattle) cause significant disturbance to wetlands, impacting biodiversity, water quality and cultural heritage values, but funding for management has been inadequate. Feral ungulates may also contribute to greenhouse gas emissions (GHG) through their disturbance of soils and vegetation, but the levels of carbon abatement achieved with their control is not well characterised across Australia. This project will work with Traditional Owners, academics, and governments to characterise carbon abatement and biodiversity enhancements of non-native ungulate control in wetlands, providing science that will underpin development of an Emission Reduction Fund method, where payments for carbon credits and biodiversity enhancements would fund management of feral ungulates on Country. The project aims to (1) Measure and monitor GHG fluxes (CO<sub>2</sub>, CH<sub>4</sub>, NO<sub>2</sub>), soil and vegetation carbon stocks, and biodiversity metrics in Australian coastal and floodplain wetlands, (2) identify indicators that may best be used to predict GHG abatement and biodiversity change, (3) Collate data on the costs of feral ungulate control measures, (4) Synthesise scientific and traditional knowledge evidence for feral animal removal as a carbon and biodiversity enhancement strategy, (5) Estimate potential income from carbon biodiversity with feral ungulate control and a cost-benefit analysis of feral control activities. It links with other National Environmental Science Program (NESP) projects including Indigenous led management of large feral animals, Indigenous land management preparedness for environmental markets, and Overcoming barriers to marine restoration.

Recent engagement with Indigenous stakeholders has revealed diverse viewpoints from Aboriginal communities on feral ungulate management, with some keen to protect Country by removing feral ungulates, while others seeing feral ungulates, such as buffalo, as a part of Country and have included them in cultural practices. Initially, we have conducted a global analysis of the impacts of non-native ungulates on greenhouse gas (GHG) emissions and soil and biomass carbon stocks of wetlands across tropical and temperate sites. We found that global wetlands emit ~25% more tonnes of CO<sub>2</sub> equivalents per hectare (tCO<sub>2</sub> eq ha<sup>-1</sup>) per year in the presence of ungulate species. We also found global wetlands store ~1.6-fold more tCO<sub>2</sub> eq ha<sup>-1</sup> in the absence of invasive ungulate livestock. But other factors such as climate, soil type, and animal density are likely to influence effects, which require further investigation. A recent global literature review has also found evidence for negative impacts of non-native ungulates on biodiversity, particularly on reptile and bird diversity in Australia, however impacts are influenced by ungulate species, wetland typology and environmental factors. In this talk, we will provide some preliminary results on the carbon abatement and biodiversity enhancements from controlling feral ungulates in wetlands and discuss the opportunity for the management on feral ungulates through carbon markets to improve the condition of degraded wetlands on Country.

**Biography**

Dr Valerie Hagger's research focusses on enhancing the management of coastal wetlands by identifying the drivers of conservation and restoration success, the opportunities for coastal wetland restoration, and the unique biodiversity of wetlands. She holds an AXA-UNESCO research fellowship on mangrove community forestry, endorsed as an action of the UN Ocean Decade. She has published research on the drivers of global mangrove losses and gains and coastal wetland restoration opportunities in Australia and has co-authored international guidelines on mangrove restoration and incorporation of coastal wetlands into national greenhouse gas inventories. Valerie supports the restoration community through her roles with the Society of Ecological Restoration Australasia and Australia's Restoration Decade Alliance.



**Oral Presentation**

2.05pm Wednesday 21 June 2023

**Constructing a Benefit:Cost Analysis for the Western Riverina Pig Program****M. Leane**<sup>1</sup>, S. Holberry<sup>2</sup>, N. Robinson<sup>3</sup>, A. Roberts<sup>4</sup>, G. Park<sup>4</sup> and H. Clayton<sup>5</sup><sup>1</sup> Riverina Local Land Services, 87 Sheridan Street, Gundagai, NSW, 2722, Australia<sup>2</sup> Riverina Local Land Services, 56 Lachlan Street, Hay, NSW 2711, Australia<sup>3</sup> Riverina Local Land Services, 8 Bolton Street, Narrandera, NSW, 2700, Australia<sup>4</sup> Natural Decisions, 19 Wyndham Street, Newstead, Victoria, 3462, Australia<sup>5</sup> Fenner School of Environment and Society, The Australian National University, Frank Fenner Building 141, Linnaeus Way, Acton, ACT, 2601, Australia**Corresponding author:** Michael Leane, [michael.lean@lls.nsw.gov.au](mailto:michael.lean@lls.nsw.gov.au)**Abstract**

The Western Riverina Pig Program (WRPP) NSW covers 1.4 M ha in the lower Murrumbidgee and Lachlan River systems, encompassing agricultural land (grazing and some irrigated cropping) and high value environmental assets (Yanga National Park, Gayini Nimmie Caira, Great Cumbung Swamp and the Booligal wetlands). The program has been in place since 2016. Local Land Services (LLS Riverina, Western and Murray) commissioned a Benefit: Cost Analysis (BCA) to develop a business case for future investment. Current funding is insufficient to suppress pig populations to levels enabling land managers to maintain lowered abundance through ongoing private funding.

In BCA, benefits and costs are calculated that are additional to the 'base-case'; clearly defining this is essential to assess benefits and costs of agreed options. The base-case was agreed as continuation of the current program using aerial shooting for primary control on favourable pig habitat areas (to the extent funds allow) and funded contractor services for additional ground control (baiting and trapping). Options assessed cover best realistic control over the WRPP, targeted control to favoured pig habitats, ground control only and transitioning to landholders taking primary control responsibility.

The BCA process, being conducted with LLS staff and stakeholders, has highlighted important information gaps. For example, although approximately 50,000 pigs have been removed since 2016, there is limited information on the baseline population, carrying capacities of habitat types, reproduction rates, immigration into the project area following pig control and relationships between pig density and agricultural and/or environmental damage. This will also be the case for many other large scale feral pig programs. Sensitivity analysis will be conducted to examine how results vary across a range of parameter values that are associated with high uncertainty.

This study is quantifying agricultural and environmental benefits. The Investment Framework for Environmental Resources (INFFER) is used for the BCA because it can be used to assign monetary values to environmental assets in the absence of detailed economic studies. LLS initially hoped that benefits associated with biosecurity (reduced impacts of disease, particularly foot and mouth), reduced human illness and mental health impacts would be quantified, but a review of the literature and available data confirmed that, currently, there was insufficient information.

As well informing future directions and investment for the WRPP, the learnings from the BCA can be shared with other feral pest programs to help improve program design, monitoring, cost-effectiveness and to maximise the chances of maintaining long-term benefits.

**Biography**

Michael Leane is the manager of Biosecurity & Emergency Services at Riverina Local Land Services. He is involved in vertebrate pest management in southern NSW for over 20 years. He has developed and implemented a number of coordinated landscape scale pest management plans for wild dogs, rabbits and feral pigs. His current focus is on developing monitoring programs to establish baseline populations to determine the cost and effectiveness of control techniques.



**Oral Presentation**

2.15pm Wednesday 21 June 2023

**Measuring environment costs of feral pig impacts in the Whitsunday Region, Central Queensland.**S.M. Hardy<sup>1</sup> and B. Fuller<sup>1</sup><sup>1</sup> Whitsunday Regional Council, 83-85 Main Street, Proserpine, QLD, 4800, Australia**Corresponding author:** Scott Hardy, [scott.hardy@whitsundayrc.qld.gov.au](mailto:scott.hardy@whitsundayrc.qld.gov.au)**Abstract**

One of the reasons why feral pigs need to be removed from the landscape is because of their impacts on the environment. Pigs can be particularly damaging to stream banks, waterholes, wetlands, biodiversity, vegetative cover, water quality and aquatic fauna due to their rooting and wallowing behaviours.

It is becoming more important to develop financial metrics for pest management activities to justify investment. Various government departments and corporate funders will want to know whether the investment of funds for pest management is good value or not. While there are qualitative or description values assigned to feral animal impacts, there are not many studies which develop a quantified financial assessment of pest management activities. Feral pig impacts can be observed, documented and measured; it has been more difficult to assign the financial costs on the environment.

The Whitsunday Regional Council has developed a method to attempt to quantify the environmental cost of feral pig impacts. The main principles used by the Council to develop the environmental costs of feral pig impacts include:

- The landscape is separated into landscape regions.
- The ecosystem is divided up into ecosystem elements such as the soil, water and the various vegetation components.
- The financial value of the regional ecosystems is based on the Queensland government environmental offset values per hectare.
- It is assumed that with the estimated feral pig population of 19,000 animals, that 0.5% of the landscape maybe be subject to feral pig impact. However, the feral pig impact will not be consistent and there will be areas which will be “partially damaged”.
- To accommodate the incomplete damage caused, a “damage factor” was applied at a discount rate of 30%. The incomplete “damage factor” of 30% assumed that the feral pigs will not completely damage all the ground resources or water resources in the area which they occupy.

The Whitsunday Region Council feral pig environment damage financial assessment found that the estimated feral pig population of 19,000 caused approximately \$28,500,000 damage per year. This cost assessment means that the average feral pig is causing \$1478 of environmental damage per year.

While the environmental financial assessment is quite general it is considered that the assessment provides a general guide on the value of feral pig environmental impacts. The other benefit of undertaking the financial environmental assessment is improving our ability to report feral animal control activities using a more triple bottom-line approach.

**Biography**

Bren started his involvement in feral animal control in the mid-1990's in Arnhem land and Gove in the Northern territory. In 2006 Bren moved back to the Whitsundays to take up a role with the Whitsunday Regional Council as a Land Protection Officer with a focus on feral animal control and weed management. Over the last 17 years, Bren has assisted the Whitsunday Council to develop a dedicated Feral Animal Control Program with aerial shooting being added in 2012. Bren is also a keen recreational shooter and is a member of the Bowen SSAA Club.



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## Poster Presentations

### BoarBuster traps in Australia: Testing and adapting the BoarBuster trap to Australian conditions

P. Jeffers<sup>1</sup>, G. Schoorl<sup>1</sup>

<sup>1</sup> GPS Trapping, Tamarind Street, Kirwan (Townsville), QLD 4817 Australia

**Corresponding author:** Pattie Jeffers, [pattiejeffers@yahoo.com.au](mailto:pattiejeffers@yahoo.com.au)

#### Abstract

Graham Schoorl would regularly manage feral pigs by trapping on the Atherton Tablelands on farms bordering the Wongabel State Forest. Trail cameras showed that his corral and box traps were only catching around 35% of the pigs seen on camera at the bait site. By adding either a training door or a trip wire it increased to 45%. As the level at which population control starts is considered to be at least 70%, a better trap was needed. A possible solution was the BoarBuster trap from the USA, however they were untested in Australian conditions.

The BoarBuster traps were tested for three years on farms, State Forests and National Parks around the Atherton Tablelands and as far north as Cooktown. The BoarBusters were assessed for robustness, their technological fitness for Australia, the capture rate and the best procedures to make them work efficiently. This included trialling different bait foods & procedures.

Use of BoarBuster traps resulted in:

- 99% of the pigs that came to the bait station were caught.
- landholders reported seeing no pigs in trapped areas after two years of trapping.
- American researchers found the BoarBusters trapped 88% of the pigs in an area and our results appear to provide similar levels of reduction.
- plants regrowing in the rainforest streams due to reduced feral pig impacts.
- zero non-target animals caught or injured.

The mechanical parts of the BoarBuster trapping system are extremely well made and robust. These mechanical parts only needed washing and an annual paint job, nothing else. The mobile network and satellite versions of the cameras both connect to the Australian networks/satellites. Many landholders preferred the BoarBuster to poisons for pig control on smaller properties. The traps are safe for cassowaries and other non-target animals. BoarBusters are suitable for areas of closed canopy where aerial shooting is not an option, suitable for small sounders and for catching pigs for GPS tagging & re-release. The effectiveness of the trap is outstanding, with the correct pre-feeding and patience.

The live-feed cameras and electrical wiring were impacted by insects, animals, and heavy rainfall, despite modifications done before field placement. Although the traps are portable, trapping sites are limited to within 100m of a track accessible by motor vehicle & trailer. Some technical expertise is required to connect the cameras, however once working the cameras were excellent: easy to use, reliable and came with excellent technical support. With some modifications the BoarBuster traps are suitable for Australian conditions.

#### Biography

GPS Trapping is the business of Graham Schoorl (diesel fitter) and Pattie Jeffers (BAHons in Archaeology, GradDipAccg, CPA). They first became interested in feral pig control when staying on the Atherton Tablelands they witnessed sixteen feral pigs grazing openly on a cow pasture. After trying several different home-made traps, they decided that they needed a better pig trap and Graham found the BoarBuster. For the past three years they have been trapping with the BoarBuster and have managed a community engagement project during which they tracked feral pigs with Ceres Tag GPS ear tags.



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**Poster Presentations****Integrating AI enabled Thermal & Multispectral Long-Range Drones into Feral Pig tracking and removal programs****A. Quinn**

Greyman Ops, 8/1631 Wynnum Rd, Tingalpa Qld 4173, Australia

**Corresponding author:** Adam Quinn, [ops@greyman.com.au](mailto:ops@greyman.com.au)

**Abstract**

Greyman Ops have been integrating advancements in unmanned aerial vehicle (UAV) technologies, utilising the latest AI driven, long range drones with thermal and multispectral/LIDAR photogrammetry to provide real time data on pig populations and movements. These developments have been shown to improve efficacy and reduce costs of delivering co-ordinated aerial and land destruction programs.

Leveraging recent developments in UAV technologies, Greyman Ops has been investing in high-performance UAV's, AI software and upskilling our team with qualifications and capabilities to operate long range drones with thermal and multispectral cameras for day and night operations. Satellite driven flight paths to 10mm accuracy, are flown regularly to detect changes in tracks, paths, mob sizes and other evidence to build data driven models, which increases probability of targeted removal programs. AI software is then used to assess imagery & data collected from the drones to assess changes in pig movements and patterns, and the impacts on the environments and ecosystems.

Data on other pests (weed and vertebrate species) can also be collected and modelled in the same operations.

It's more than just buying the latest tech (hardware and software) – having the skills to operate the sophisticated and expensive equipment takes time and relationships with landowners.

Pest controllers with local knowledge are important to develop accurate models for proactive programs to remove feral pigs.

**Biography**

Adam Quinn is the founder and Managing Director of Greyman Ops which specializes in integrated Environmental, Ecological and Biosecurity planning development, education, and feral animal treatment programs.

He also is the Managing Director of 3 Gun Tactical, a Licensed Firearms Dealer with strong experience in skills development and training programs.

Previous experience in Corporate Finance, Management Consulting and Capital Raising provides strong project management and planning experience to Government and Private clients.



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## Poster Presentations

### Sustainable solutions: managing safety and effectiveness for feral pig control in a peri urban setting

#### K. Duzevich

Leschenault Biosecurity Group, 18302 South Western Highway, Donnybrook WA 6239

**Corresponding author:** Kate Duzevich, [kate@lbginc.org.au](mailto:kate@lbginc.org.au)

#### Abstract

Leschenault Biosecurity Group (LBG) uses the HOGGONE® Feral Pig Control System, as its primary tool for feral pig control. LBG was the first group in Western Australia to trial the use of this system for feral pig control. This system involves a specific type of bait, placed within boxes carefully designed to allow pigs to smell and easily access bait after limited pre-training, while keeping other animals, rain and extreme heat away from the bait placed in the boxes. After several successful trials, the group adopted use of this system, finding it to be a reliable and highly effective, humane component of its Feral Pig Control Program used in collaboration with participating landholders on their private properties within the LBG operational area.

The LBG have found this be a very effective, fast acting and humane feral pig management alternative, because:

- Risks of off-target animals accessing the bait is very small.
- It does not require formal training or qualifications for land managers to purchase or use the product.
- It is safe for operators (when used in alignment with manufacturers' instructions).
- It is relatively low cost.
- Works well in the group's peri urban and intermittently heavily forested operational area in which other control methods such as ground and aerial shooting and traditional baiting programs are not practical.

A local landholder, Bob Grieg, who participated in the group's first trial of this system in 2020, also returned to LBG for subsequent HOGGONE installations at his 100-acre property to address "new" pig activity. According to Bob, "It's a battle to manage feral pigs in this area. We provide the food in the paddock; the forest provides the shelter. It's very difficult to have any method that gets all of the pigs on your property in one go; a rare event. The beauty of this system is that once you get them to eat from these boxes, it's 100% effective for all of them. It seems to be that if you have enough HOGGONE boxes, you can get all of them in one go." He added that he and the LBG are learning together from each trial.

LBG is proud of its feral pig control program successes and the support the group has gained from landholders within its operational area who repeatedly turn to the group for assistance with removing feral pigs on their properties.

#### Biography

Leschenault Biosecurity Group is a not-for-profit, community organisation providing support to private landholders within their operational area in southwest Western Australia with the management of declared pests. The group is a recognised biosecurity group operating under the WA Biosecurity and Agriculture Management Act, working with diverse stakeholders to support and encourage consistent, integrated, and cooperative management of priority declared pests – as determined by community – at a landscape scale across tenure. The current priority declared pests for which the group may spending it funding includes, three vertebrate pests: feral pigs, rabbits, foxes and seven plant pests: Apple of Sodom, Arum lily, blackberry, Bridal Creeper, Cape Tulip, Cotton bush and Paterson's Curse.







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We would like to thank all our registrants (both in-person and virtual).

We hope to see you at a future National Feral Pig Conference!

