

The Hinchinbrook Community Feral Pig Management Program (HCFPMP)

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The Hinchinbrook Community Feral Pig Management Program (HCFPMP) was initiated in 2009 in response to increasing community concern about the impact of feral pigs on the economic, environmental and social fabric of the Hinchinbrook Shire. This followed the demise of a government-based feral pig trapping program which had been implemented in the region a few years earlier. The resulting lack of coordination of local community feral pig control activities soon led to a rapid increase in feral pig numbers particularly in the local government areas of the Hinchinbrook, Cassowary Coast and Douglas Shires and in the Cairns Regional Council area.

In the Hinchinbrook Shire a number of stakeholder meetings were held to develop a feral pig management plan that would be suitable for the Hinchinbrook community into the future. The program that was agreed upon provided the basis of the current model and relied on voluntary contributions from stakeholders that would be utilised to employ a full-time field officer to manage feral pig activities across all land uses. The partners of the original program, see Figure 1, included Hinchinbrook Shire Council, Herbert Cane Productivity Services Limited, Terrain NRM, three Queensland Government departments (DERM, QPWS and FPQ) and two commercial MIS agribusiness and forestry companies (ITC Ltd. and Rewards Group).

Figure 1. The original Hinchinbrook Shire Community Feral Pig Management Program flier in 2009

Need Help with Feral Pigs

Hinchinbrook Shire's Community Feral Pig Management Program

Assistance given:

- Assistance with receiving and setting up of a Trap while taking part in the program.
- A 1080 baiting service provided to eligible landholders.
- Advice and support on best practice
- Access to an at cost bait supply

Program partners:

HSC, HCPSL, Terrain NRM, DERM, ITC Limited, Rewards Group, QPWS & FPQ

A program set up to assist the community to better manage feral pigs on lands under their control and to reduce the environmental, social and economic impacts they are having in our community.

For further information please contact councils Feral Pig Management Officer, David Bacchiella on 47764607 or 0458764660 during office hours

In other sugarcane areas in far north Queensland, alternative methods of tackling the feral pig problem were proposed such as the use of commercial contractors with a focus on developing competition between different contractors. This model however did little for cooperation between contractors and in the Cassowary Coast Shire resulted in a much higher cost: benefit ratio. In the longer term this model proved unsustainable both from a financial and collaboration perspective because it was not attuned to the needs of either landholders or investors in the program.

Feral pigs are one of the most prolific and devastating of Queensland's introduced animal pests. In Queensland, feral pigs are a declared Class 2 pest, which means that they can potentially cause significant adverse economic, social and environmental impacts (Mitchell, 2011). Under the *Federal Government Environmental Protection Biodiversity Conservation Act 1999*, landholders are required to meet specific requirements to manage and control this animal pest. Under the *Queensland Biodiversity Act 2014*, a landholder is required to take reasonable steps to keep their property free of feral pigs.

Feral pigs can cause significant economic losses to specific cane properties in the Herbert region through the destruction of cane crops and damage to farm infrastructure like headlands and drainage systems. The economic loss caused by cane damage and decreases in CCS due to deteriorated cane can exceed \$1 million to the Herbert cane industry in some years (DiBella et al, 2014a)

Original objectives of a Hinchinbrook Feral Pig Management Program

In the Hinchinbrook Shire it soon became evident that if a feral pig management program was to be successful it would need to have a set of clear objectives that had been designed and agreed upon by the full cooperation and collaboration of all stakeholders. These objectives were:

- To coordinate feral pig management throughout the Hinchinbrook Shire;
- To assist individual and groups of landholders to establish their own feral pig management programs by providing them with the relevant training and advice on best practice and with traps on loan to initiate a trapping program;
- To promote the benefits of taking part in the program to the community via local print media, on council and social websites, at grower group meetings, NRM forums, field days and at the Ingham Show;
- To undertake control programs such as trapping, baiting, aerial shooting and coordinated hunting that would minimise the number of feral pigs in areas of strategic importance;
- To collect and maintain a database on all feral pig management activities including pigs caught or shot, baiting programs initiated, monitoring programs implemented and to report back to stakeholders as required;
- To provide a convenient, low-cost bait supply to landholders taking part in the program (banana farms in the Tully area);
- To continue to grow, refine and improve the ability of the program to deal with feral pig issues within the Hinchinbrook Shire and adjacent areas.

It was from these initial objectives that the Hinchinbrook Shire now has the second longest running feral pig management program in Australia and has undertaken many research and opportunistic program activities to overcome the constant challenges of achieving continuous improvement from a declining allocation of resources.

Pig control methods

From its inception the HCFPMP has utilised a range of control methods to reduce pig numbers as effectively as possible.

Pig trapping using portable cages or permanent traps was traditionally employed by many land holders for feral pig control. This involves pre-feeding the trap with food and once the pigs were feeding freely, the trap would be set to try and maximise the number of pigs caught. This method relies on the pigs being lured into the trap, the trap being triggered and then being strong enough to contain the pigs until they can be euthanised and the carcasses disposed of by the landholder as soon as possible. However, without coordination, trapping is often opportunistic and is commonly used in response to crop damage and losses already sustained by the landholder.

Baiting is a second method used to control feral pigs and is more effective than trapping because the pigs only need to eat the bait in order for the control to be effective, whereas trapping relies on pigs being lured into a trap and then held for long enough to euthanise them effectively. The use of sodium fluoroacetate (1080) is the most widely accepted and humane toxin for feral pig control and is the only toxin currently recommended by state and local government, due to the limited impact on non-target species. Baits using poisons such as SAP or CSSP containing phosphorus can result in a prolonged and painful death for any animal that ingests them and can also cause serious off-target implications for secondary consumers. Over the past 10 years, 1080 baiting has accounted for about 60% of all the feral pigs controlled under the HCFPMP and has been an important component of the current success of the program.

Currently, the HCFPMP purchases banana baits from a large commercial grower in Tully, with the HCFPMP feral pig management officer collecting baits on a weekly basis. These baits are supplied to farmers as a cost recovery activity. The program also stored mangoes in freezers located at HSC and HCPSL during the cyclone period from December to April in the event of a cyclone decimating the north Queensland banana industry. Mangoes have been collected locally and from mango packing sheds located at Giru. Cyclone Yasi in 2011 had a severe impact on the north Queensland banana industry and left the HCFPMP with no bait supply for about 8 months, causing significant crop losses in the following year because there was limited opportunity to manage feral pigs (see Table 1). The HCFPMP has also investigated alternative bait supplies such as pre-packaged baits and alternatives to banana and mangoes but with very limited or no success to date.

The use of **aerial shooting** as a control technique has become an important tool for the program in areas of the landscape where access is limited. The coastal wetlands of the Hinchinbrook Shire have limited access during certain times of the year due to wetland inundation and have traditionally provided refuge for a large breeding group of feral pigs. The federal government's "Nest to Ocean" funding program provided HCFPMP with the opportunity to trial and implement an annual aerial shooting program, which previously could not be afforded.

The HCFPMP has now fine-tuned its aerial shooting activities to occur during periods when pigs move to more isolated areas like National Parks and marginal areas because there is little food available in cropping areas. Similarly, during drier periods when there is a lack of food and harbourage in cropping areas, feral pigs migrate to the large areas of natural wetlands along the coastal fringe of the Hinchinbrook Shire. This often coincides with the period when threatened turtle species nest along the beaches of Hinchinbrook and are vulnerable to predation. This provides an opportunity to target large mobs of feral pigs in these relatively isolated areas through aerial shooting and helps protect turtle eggs and the young hatchlings. The effectiveness of this control

measure is improving through advances in thermal imagery technology and improved coordination between pilots and marksmen.

The use of **pig hunting and dogging** was originally considered an essential component of the control measures evaluated by the Stakeholder Advisory Committee. However, the sheer number of “pig chasers”, their apparent lack of skill, their indiscriminate actions in relation to interference with HCFPMP baiting and trapping activities, and trespass onto private property soon demonstrated that their activities resulted in more harm than good in the longer term. Amateur pig hunters have cost the Hinchinbrook program a significant amount of money in failed trapping and baiting through the deliberate sabotage of HCFPMP activities.

Impact on pig numbers and cane production

Herbert Cane Productivity Services Limited (HCPSL) survey all cane growers in the Herbert annually for data on crop losses incurred by feral pigs. The data are geo-referenced to cane blocks and yield losses can be calculated. Periodic field validations of reported losses by growers are undertaken by HCPSL staff to validate the grower reported figures. The assessment required stalks from both the damaged and non-damaged locations within a block to be weighed in order to calculate a crop yield for each treatment. Hinchinbrook Shire Council (HSC) also collect data on the numbers of pigs controlled by trapping, baiting, dogging and by ground and aerial shooting. Whilst numbers of pigs controlled vary considerably from year to year, a large number of the pig control actions have occurred as a direct response to landholders requesting assistance from the HSC pig management officer.

Table 1 - Estimates of crop losses and pigs removed 2009-19 (data from HSC & HCPSL)

Year	Pigs controlled	Tonnes cane lost
2009	807	28725
2010	948	15992
2011	795	No data ¹
2012	929	33324
2013	652	12599
2014	1018	6044
2015	796	5540
2016	550	6373
2017	662	12977
2018	550	10837
2019	163	15299

¹ No data on crop losses collected due to crop damage by Cyclone Yasi

Ten Year review of the HCFPMP

In the ten years from 2009 to 2019 the HCFPMP was reviewed annually through the Stakeholder Advisory Committee who were provided with an Annual Report and the opportunity to discuss any concerns as part of Hinchinbrook’s Local Government Area Biosecurity Plan. However, increasing pressure on available funding from some stakeholders and proposed changes to the availability of sodium fluoroacetate (1080) as the preferred poison of choice for baiting caused the Stakeholder Advisory Group to decide that a review of the entire program was warranted. The objectives and findings of this review has been documented in great detail by Michael Nash, Natural Assets Manager, Hinchinbrook Shire Council (Nash, 2020) and are reproduced with his permission.

The objectives of the review were:

- To review and assess the successes and failings of the HCFPMP;
- To seek feedback from participants and the public on the perceived value of the program from a broader community perspective;
- To revisit the stakeholder membership and governance arrangements to ensure that they are fit for purpose and reflect the needs of investors, the catchment and the community;
- To review other programs, research and innovations that should be considered and/or incorporated into the future of feral pig management in the Hinchinbrook Shire.

When assessed against the original scope of the program, the HCFPMP has been relatively successful. However, as the review intended, stakeholders have identified some areas for improvement that need to be considered by the stakeholders in the design of the new program moving forward. A summary of the review discussions is outlined in Table 2 (reproduced from Nash, 2020).

Table 2 – Evaluation of HCFPMP from 2009 – 2020

Original Program Scope	Key Indicators	Success (1-5)	Comments
1. To coordinate feral pig management throughout the Hinchinbrook Shire	Partners continue to collaborate and fund the program Sharing of data and equipment maximises pig control	5	HCFPMP has been sustained by partners for 10 years and committed to continuing the program
2. To assist landholders to establish their own feral pig management program by providing them with the relevant one on one training and advice on best practice and to further provide them with traps on loan to initiate a trapping program	Landholders are largely self-sufficient once trained Landholders continue to be engaged in pig control Landholders provide feedback to program	3	Growers capacity to become self sufficient is variable between growers/ demographics. Engagement remains high in priority areas Overwhelming support from community survey to continue, but some want even more to be done.
3. To promote the benefits of taking part in the program to the community via local print media, on council and social websites, at grower group meetings, NRM forums, at the Ingham Show and relevant field days	Number of media releases and reports generated Program supports forums and shed meetings	3	Annual reporting to investors has been good. Perhaps more could have been done to engage hunters and stress the importance to the broader community on the projects objectives to garner support.
4. To undertake control programs such as trapping, baiting, aerial shooting & coordinated hunting that will minimise the number of feral pigs present in areas of strategic importance	Numbers of pigs controlled Reduction in the amount of damage from pigs reported	4	As far as coordinated control measures spatially and temporally to maximise resources... this has improved overtime and is a credit to the team. Reduction in crop damage estimated to be over \$1 million pa
5. To collect and maintain a data base on all feral pig management activities, including pigs caught or shot, baiting programs initiated, monitoring programs implemented and to report back to stakeholders as required	Number of pigs controlled by what means to assess effectiveness and cost benefit	5	Data collection through Apps developed for HSC provides control and spatial data that can be analysed to improve efficiency and targeted control.
6. To provide a convenient low cost bait supply to landholders taking part in the program (Mackays, Tully)	Numbers of baits provided to landholders for feral pig management	4	Maintenance of Tully Banana supply through difficult changes in Industries and BQ requirement. Back up supply of Mangoes now a staple of the program as a risk reduction measure.
7. To continue to grow, refine and improve the program's ability to deal with feral pig issues within the Hinchinbrook Shire and adjacent areas.	Amount of resources available to the HCFPMP by stakeholders The number of activities being undertaken , including research to improve knowledge of feral pig management. No. of improvement made by the program over time.	4	Although variable from partner to partner (funding)... Investment has increased over time to meet operational requirements. Activities include: DNA, Baiting Trials, SN Trials Changes: increased aerial shooting, seasonally target mobs, more baiting, addition of turtle protection.

A Hinchinbrook Community Feral Pig Management Program Survey was conducted prior to the program review in September 2020. A link to the survey was sent out via Council's Facebook page, via the Council website, via direct email to growers through HCPSL and directly to those involved in the Council-led program. The survey was open for about 2 weeks and received 34 responses: 88% of respondents reported some damage to crops from feral pigs, 59% believed that pig numbers around their properties had decreased in the past 5 years while 20% reported that numbers had increased. In terms of the overall program evaluation, over 79% of respondents rated the program as good or very good for reducing pig numbers with only 10% dissatisfied (poor or very poor) with the current arrangements. In terms of 'value for money' and 'access to support', the numbers were again very similar with 75-85% of survey respondents scoring the program satisfactory or better.

Over the past 10 years some partners have left the HCFPMP in response to funding shortages and changed priorities for invasive species. Other stakeholders have made consistent contributions because of the perceived value of investing in a coordinated whole of catchment approach to feral pig management. Unfortunately, changes in the way the state government allocates funding for the

management of state land has diminished the availability of project funding for high priority areas within the Hinchinbrook Shire. This represents a serious challenge to the future sustainability of the HCFPMP.

Many government agencies are now subject to project funding and unless they have a 'project' that is funded there is simply no money available for the control of feral pigs on land included in their area of responsibility. This has been identified as both a serious challenge to the sustainability of the HCFPMP but also an opportunity to seek and obtain additional targeted funding for high priority areas within the Hinchinbrook Shire both now and into the future.

Stakeholder contributions

Stakeholder contributions of cash and in-kind to the HCFPMP from 2014 to 2021 are summarised in Table 3, which has been adapted from Nash (2020). Project funding is also included.

Table 3 – Summary of Stakeholder Contributions (cash and in-kind) to the HCFPMP 2014 – 2021

Funding Provider	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
HCPSL	42350	57500	57500	57500	59500	60500	61600	62680
Hinchinbrook SC	32200	32200	33400	45300	10200	38700	59200	62500
DNRM	10500	10900	11200	11500	11800	12000	12260	12500
QPWS	20000		5000	5000	1000	5800	6800	7800
H Q Plantations	5600	5800	6000	6100	6300	6400	6500	6600
Terrain NRM	18000							11000
Nest to Ocean		75000	25000					
Qld Pest Initiative				38000	15200	22800		
Greening Australia					30000	13000	10000	10000
Total funds	128650	181400	138100	163400	134000	159200	156360	173080

Review of other programs

The ten-year review of the HCFPMP was used as an opportunity to review other successful programs and find out what lessons can be learnt that may be applicable to the Hinchinbrook Program. In particular it allowed the investigation of new ideas and innovations that technology can provide that may save time, make better use of limited resources or provide additional intelligence to inform and improve on-ground activities.

Coincidentally, with the detection of African Swine Fever in Papua New Guinea, and the threat this poses to Northern Australia and the \$3 billion Pig Industry, the Federal Government is developing a National Feral Pig Action Plan. Given the recognised successes of the Hinchinbrook program the government has sought a lot of advice on what has been the recipe for success and what aspects of the Hinchinbrook program should be incorporated into the National Action Plan.

Through this network established with the Federal Government, it has become clear that the latest research clearly suggests that unless control programs are managing/removing at least 75% of the total pig population each year, the total numbers of feral pigs will continue to grow exponentially. However, a target of 75% or more can be very difficult to achieve particularly when the true population densities of pigs in the landscape are not well known and are very difficult to assess.

Clearly trust and cooperation between stakeholders is essential if practical outcomes are to be achieved and this appears to have been a key to the success of the HCFMP.

Other work, conducted by NSW DPI, has developed a data collection system called *FeralPigScan* which may provide a way of engaging with pig hunters and doggers, or at least keeping track of what they catch and where they are operating. *FeralPigScan* is a free app for landholders, Landcare and community groups, local Councils, professional pest controllers and biosecurity groups to use. It allows the recording of feral pig activity and sightings, crop damage, soil disturbance, control activities and photos from monitoring cameras. It also allows maps to be produced of feral pig activity to help guide control efforts.

The HCFMP has also conducted and commissioned a considerable amount of research including: genetic tracing to identify discrete feral pig populations and look for migratory patterns in the Hinchinbrook Shire; fruit, grain and commercial bait trials; and is now looking into the role of thermal imagery, image recognition and artificial intelligence (AI) as a tool to identify and target feral pig control and improve monitoring and evaluation aspects of the program. The possible use of novel technologies like smart traps, thermal imagery, AI and image recognition are currently being assessed by the HCFMP through the Queensland Feral Pest Initiative, a Queensland government program.

Some of this research formed part of a Grower Group project: *Integrated Feral Pig Management for the Herbert cane area* (Project GGP006) initially funded by the Sugar Research and Development Corporation (SRDC) which later became Sugar Research Australia (SRA). This project assessed various control methods including alternative baits to attract feral pigs, the use of pheromones, and the use of genetic population mapping, cane variety impacts and habitat influences. The research trials were established in three different locations within the Herbert sugarcane region to assess management strategies for different types of landscape and topography. The locations were at Lannercost with open cane land adjacent to grazing land and forestry plantations, Hawkins Creek between the Herbert River and forested hills managed by National Parks, and the Leach area adjacent to State-managed forested land and dissected by creeks and gullies. The project details are described by DiBella et al (2014a) and in the project final report (Kemp, 2014).

As an additional component of the project, genetic material from pigs captured and killed in the shire was collected and forwarded to QUT in Brisbane. In this study genetic methods were used to examine the population structure of feral pigs in the Herbert region to gain a better understanding of the migration of feral pigs across the landscape (Fuller, 2014).

Suggested changes to the program for the future

At the Hinchinbrook Community Feral Pig Management Program Review conducted in September 2020, stakeholders revisited the original objectives of the program to ascertain whether these were still relevant or needed to be changed or adapted to meet the future needs of the community and investors. Whilst it was agreed that coordination of feral pig management throughout the Hinchinbrook Shire should remain the main focus of the program, it was felt the role of field officers needed to change from conducting the actual trapping and baiting in the field to providing support to individual and groups of landholders in establishing their own integrated pest management programs on their properties. This would be achieved through relevant one on one training, advice on best practice and through the use of traps on loan.

It was also noted by both stakeholders and landholders that the feral pig officer spends a lot of his time doing farmers' work for them. It was also noted by several survey respondents that they are

tired of doing all the work whilst their neighbours do nothing and still reap the benefits. Greater promotion of the benefits to the whole community of taking part in the program was considered necessary via local print media, on council and social websites, at grower group meetings, NRM forums, at the Ingham Show and at relevant field days.

A new funding paradigm was suggested based on project – based submissions to control feral pigs within the shire as core funding from government agencies is becoming harder and harder to justify. Although project funding is often short term, it was considered a better option as it would provide the necessary resources to support the formation of cluster groups and help build landholders' capacity to manage pigs in strategic, high priority areas using combinations of trapping, baiting, aerial shooting and coordinated hunting. This suggestion is not meant to take away from core business but more to provide opportunities to expand the program and build capacity within the program and community.

The development and maintenance of a database on all feral pig management activities including funding source, methods of control, project outcomes and efficacy of various approaches was considered essential. Improved methods of data collection, storage and analysis using apps specifically developed for HSC would enable improved reporting of project outcomes. These would provide control and spatial data that can be analysed to evaluate the efficiency of a variety of targeted control measures and would assist reporting to funding providers.

Under current arrangements there appears to be some inconsistency in who pays for bait and who does not. There needs to be a transparent and consistent approach that provides a convenient low-cost bait supply to landholders who are taking part in the program.

The final suggested modification was to improve the effectiveness and efficiency of the program to deal with feral pig issues which may include more strategic use and analysis of data to target pigs both spatially and temporally, better use of emerging technology for surveillance and control, better communication with stakeholders, and better engagement with landholders and pig hunters who are currently detracting from the program's objectives.

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