Protecting EPBC species in the Walpole Wilderness:

A South Coast NRM funded project

Final Project Report, October 2015

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SOUTHCOAST NATURAL RESOURCE MANAGEMENT Inc.

Australian Government

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Department of Parks and Wildlife

Acknowledgements

Feral pig management was carried out by the Department of Parks and Wildlife's Frankland District Nature Conservation team, in partnership with the Lake Muir Denbarker Community Feral Pig Eradication Group (LMDCFPEG) and Albany Branch of the Sporting Shooter's Association of Australia (SSAA).

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Glenn Ewing carried out a Certificate IV in Conservation and Land Management using the trial Judas pig control project, and coordinated the survey and trapping effort in Mount Frankland National Park to locate and eventually trap suitable animals, and radio-tracked and entered the tracking data.

Volunteers from the Walpole Nornalup National Parks Association and staff from Frankland District also assisted with radio-tracking of the two collared pigs. Great Southern Aviation conducted two flights over Mount Frankland National Park to pin-point an accurate location of the animals, prior to survey and dispatch.

The Walpole Nornalup National Parks Association initiated and implemented the Peat Rehabilitation Project, which has a keen community interest and involvement, including from the Walpole Primary School and the Department of Corrective Services Walpole Workcamp.

The results of flora and fauna surveys, largely conducted by Janine Liddelow and Jackie Manning, have also complemented the feral pig control to better understand our effectiveness in protecting critical habitat.

The Walpole Wilderness is a special place and probably no more special than to the Bibulmen and Minang people whose land we live and work on.

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1. Introduction

Pigs were introduced to the wild from deliberate releases and escapes of domestic animals from as early as the late 1700s in eastern Australia, and into Western Australia in the 1800s. In south-western WA the area of suitable habitat for feral pigs is much larger than their current distribution and they appear to be expanding in range (Bain and Kinnear 2015; Masters 1979; Woolnough *et al*. 2004; 2005).

There is estimated to be between 3.5 million and 23.5 million pigs across Australia, and between about 4,000 to 10,000 in the Walpole Wilderness. This variation in range is due in part to difficulty in estimating abundance over large parts of their range, and fluctuations in local populations due to changing resource availability.

The Walpole Wilderness is an area of approximately 363,000 hectares of reserve system on the south-coast of WA, between Manjimup, Walpole and Denmark. It is a highly biodiverse area of generally intact habitat that contains a rich mosaic of forest, woodland, heathland, wetland and riparian systems. It supports a range of threatened and endemic plants and animals and threatened ecological communities, with almost 2,000 recorded plant species and three endangered and ten vulnerable vertebrate species listed under the EPBC Act.

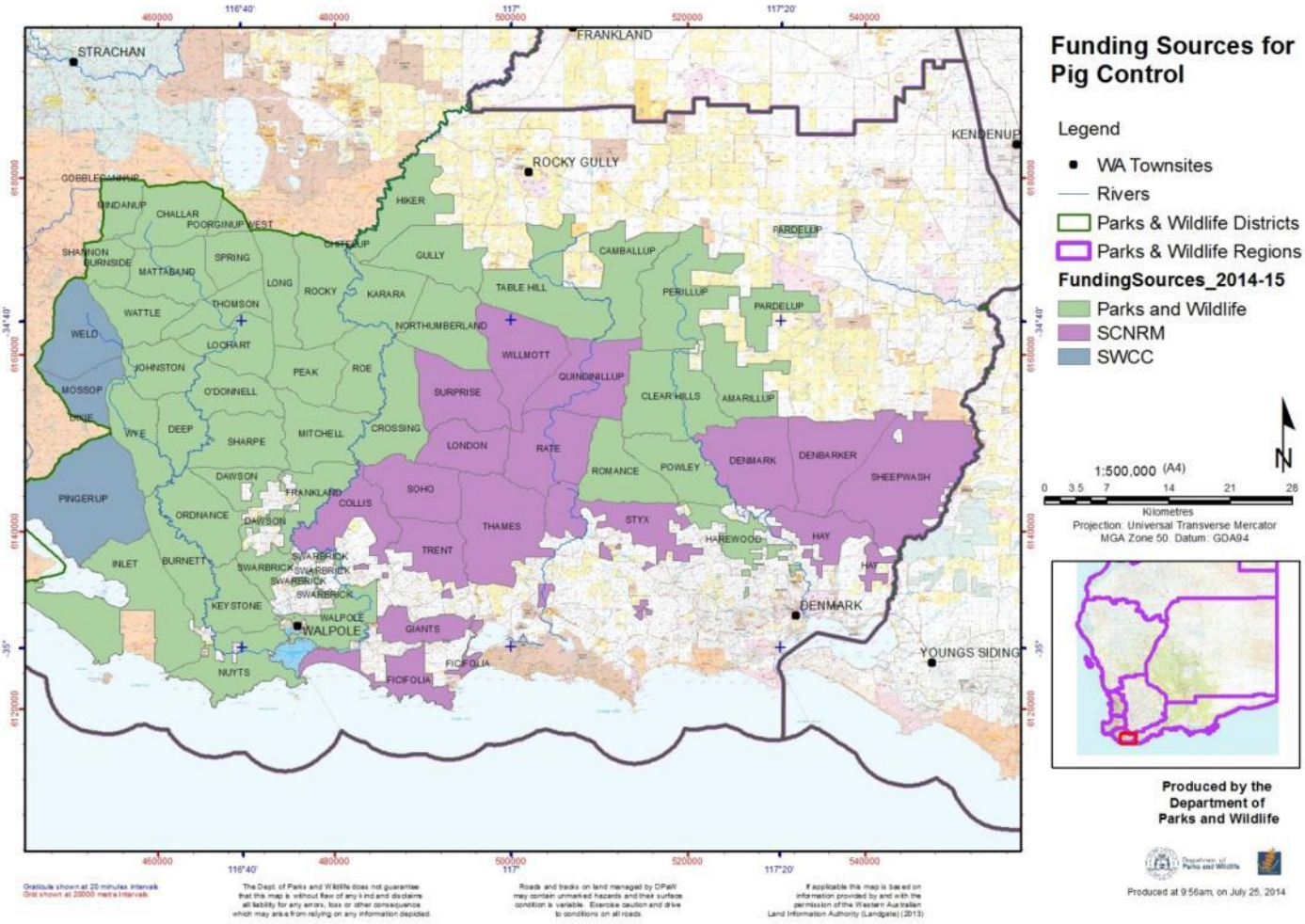

Figure 1: Conservation estate within Parks and Wildlife's Frankland District: the Walpole Wilderness, and the sources of funding for pig control across the area

Feral pigs are limited by their constant need for water. Unfortunately the Walpole Wilderness provides ideal conditions for feral pigs: a constant supply of moisture, a diverse range of habitats that provide resources through different seasons, and a wide range of food pigs consume rapidly, including frogs, birds eggs, roots, shoots, tubers of orchids, the sedge *Reedia spathacea* and other plants, small reptiles and small mammals.

The destruction to the natural environment caused by feral pigs includes direct and sometimes irreparable damage to sensitive ecosystems by their digging and wallowing; direct predation of a wide range of plants and animals; disease transmission to both wildlife and livestock of a range of diseases including tuberculosis, bubonic plague,

tularemia, foot and mouth disease, hog cholera and anthrax, and transport and spread of weed species. Pig damage also causes indirect damage to fauna populations by removing food resources from the habitat and creating pathways which facilitate access for feral predators such as foxes and cats. There is circumstantial evidence that pigs spread *Phytophthora* dieback, a water mould which affects about 40% of our flora in the south-west of WA.

From 2010 to 2013 the Department of Parks and Wildlife's Frankland District, with Australian Government funding from South Coast Natural Resource Management (South Coast NRM), conducted the project *Saving EPBC listed species in the Walpole Wilderness by removing feral pigs*. Through this project, critical habitat for EPBC listed taxa was identified and control works targeted to these areas and a buffer around them to allow for pig movement and dispersal behaviour. A key finding of this project was the effectiveness of the use of tracking dogs, particularly for small outlying populations of feral pigs away from road networks.

The current project aimed to continue the learnings from the previous SCNRM funded project, in targeting control to protect areas of critical habitat for threatened species, and work in partnership with a range of professional groups to coordinate control activities across the broader landscape.

The objectives and outputs of the project were to conserve and protect species and ecosystems by:

- Managing 108,200 hectares each year for feral pigs in the Walpole Wilderness;
- Implementing activities including survey and monitoring for presence of feral pig activity, and trapping and dispatch of feral pigs as needed;
- Carrying out follow up control (108,200 hectares) will occur in 2014/15 in these high priority areas;
- Managing and supplying GIS data for all on ground activity, and
- Producing one media article to promote EPBC species protection and/or feral pig monitoring and control results.

2. Summary of Achievements

The project commenced in December 2013. Over the duration of the project, 259 pigs were dispatched in the 363,000ha Walpole Wilderness. Of these, 79 were removed from the area from the Frankland River to the Hay River (the area which fits within the SCNRM region). Within this region the area managed for feral pigs, where control and survey regularly occurred, was 260,909ha. The areas targeted were high conservation value habitat which provides for nationally threatened species, including the *Reedia spathacea* sedge, quokka, Walpole burrowing crayfish and the Sunset frog. A number of state-listed threatened species also benefit from the control and removal of feral pigs, including the quenda, chuditch, Nornalup frog, *Microtis globula* (South-coast mignonette orchid), *Caladenia christiniae* and *Caladenia harringtoniae* (all Declared Rare Flora under the WA *Wildlife Conservation Act 1950*).

Figure 2: *Microtis globula*, a Declared Rare Flora species, impacted by feral pigs *(Photo: Frankland District)*
Figure 3: *Caladenia harringtoniae*, DRF, also impacted by feral pigs *(Photos: Florabase)*

2.1 Collaborative arrangements

The Frankland District provided input into the development of the *Feral Pig Control Strategy: South-west Western Australia 2015 – 2020*, which presents the best practice management of feral pigs in the south-west, and recommended survey and monitoring techniques to detect and monitor the impact of pigs on threatened species and communities.

Frankland District staff worked closely with the Donnelly District (based in Manjimup) and community groups, particularly the Lake Muir Denbarker Community Feral Pig Eradication Group (LMDCFPEG) and the Albany branch of the Sporting Shooters Association of Australia (SSAA). These partnerships are crucial to develop a coordinated program that targets priority areas and issues and strategically covers the large reserve system. The LMDCFPEG control was primarily based on the agricultural/reserve system interface, to protect agricultural values as well as protect the natural environment. Frankland District staff regularly attended LMDCFPEG meetings and received dispatch details from the group which have been included in the GIS datasets provided to SCNRM.

During the project, the Frankland and Donnelly Districts developed and finalised Working Arrangements with the LMDCFPEG and Northcliffe groups. This included formalising the use of tracking dogs to locate and follow pigs, which through the previous South Coast NRM funded project was found to be a key factor in finding and dispatching animals which remain off road networks and which have become trap shy. An assessment system was implemented whereby all dogs used by contractors and community groups must pass an assessment to demonstrate that the handler has adequate control over the dog, that it will not chase or harass wildlife nor make direct contract with pigs.

Frankland District contracted a local contractor, Rodney Leggerini, to work with the department's field staff and utilise his tracking dogs to target areas in the core Walpole Wilderness. A regular team of two to four staff members from Frankland District were employed in the feral pig program throughout the season, from September to June, jointly funded by the department and SCNRM.

Figure 4: Rodney Leggerini's trained tracking dog, Maggie

2.2 Trapping program

A comprehensive trapping program was conducted across the Frankland District, from September to June of 2013/14 and 2014/15. Placement of the traps is an involved task to determine areas where there is consistent levels of pig activity, in an area which is accessible enough to check each day, but hidden from view to avoid interference from park visitors or illegal hunters. Once a suitable area is identified, the trap is constructed, partially on site, with several different trap types depending upon location. Most trap types used are figure 6 traps, with a hinged swinging door. The trap door is secured open, and free-bait is placed inside the trap until pigs are sighted on remote cameras regularly going inside the trap. This process can take several weeks. Once the

traps are set, they must be visited each day to check to see if an animal has been trapped as for animal ethics reasons, animals cannot be left in traps any longer than 24 hours.

Figure 5: Pig captured on remote sensor camera near trap at Soho forest block, prior to a prescribed burn

A feral pig operations guide was developed and updated during the project, which includes standard operating procedures on trapping, ethical euthanasia of pigs, ethical use of trapping dogs, survey and monitoring techniques, and data management protocols; and was provided to all staff (both field and office) at the beginning of the field seasons.

2.3 Trial Judas project

The District also implemented a trial Judas project, to test whether 'Judas' animals would be useful in assisting to detect and locate family groups of feral pigs. Judas systems have been used successfully on other social species, and have also been used on feral pigs in eastern Australia. This technique is often used where there are low density populations across large areas and the Judas pig helps lead feral control teams to other animals which are dispatched, whilst the Judas animal is left to locate other animals.

Two feral pigs were collared by Frankland District staff during this project in the Soho and Crossing forest blocks in April and May 2015. A boar weighing approximately 45kg was trapped in April, and collared with the assistance of the Denmark Veterinary Clinic. It was tracked for several times per week on the ground using VHF telemetry, and an aircraft was used twice to pinpoint a more accurate location. The animal was dispatched in early September 2015 and was found to have moved within a range of approximately 9km^2.


Figure 6: Dr Richard Reynolds from Denmark Vet Clinic health checking the boar prior to collaring, with assistance from Dr David Edmonds from the Walpole Nornalup National Parks Association.

Figure 7: Glenn Ewing, Conservation Employee from Parks and Wildlife, radio-tracking the two collared pigs from a high point in the landscape.

Figure 8: The collared boar captured on remote camera near the site he was trapped and collared, four weeks later.

Figure 9: Winter wetland and ephemeral creek systems occupied by the boar, as located by radio-tracking from a light aircraft.

A 45kg female pig was trapped on the Frankland River in May and was also collared with the assistance of the Denmark Vet Clinic. The collar was retrieved in September. It was found in mortality mode unattached to the sow and did not show sign of being tampered with. Dr Peter Adams from Murdoch University who has collared pigs over many years has found that as they can lose condition over winter, younger animals that have not developed a large jaw structure can slip collars.

GPS data from the collar show that the animal moved across a 43ha area mostly within the riparian vegetation of the Frankland River. From May to mid-August she travelled across this range then stayed within an area approximately only 30 metres by 50 metres for three weeks before the collar went into mortality mode. This indicates she furrowed in this time, and was pregnant when she was collared or shortly afterwards. The additional requirements through pregnancy may have contributed to her losing condition and slipping the collar.

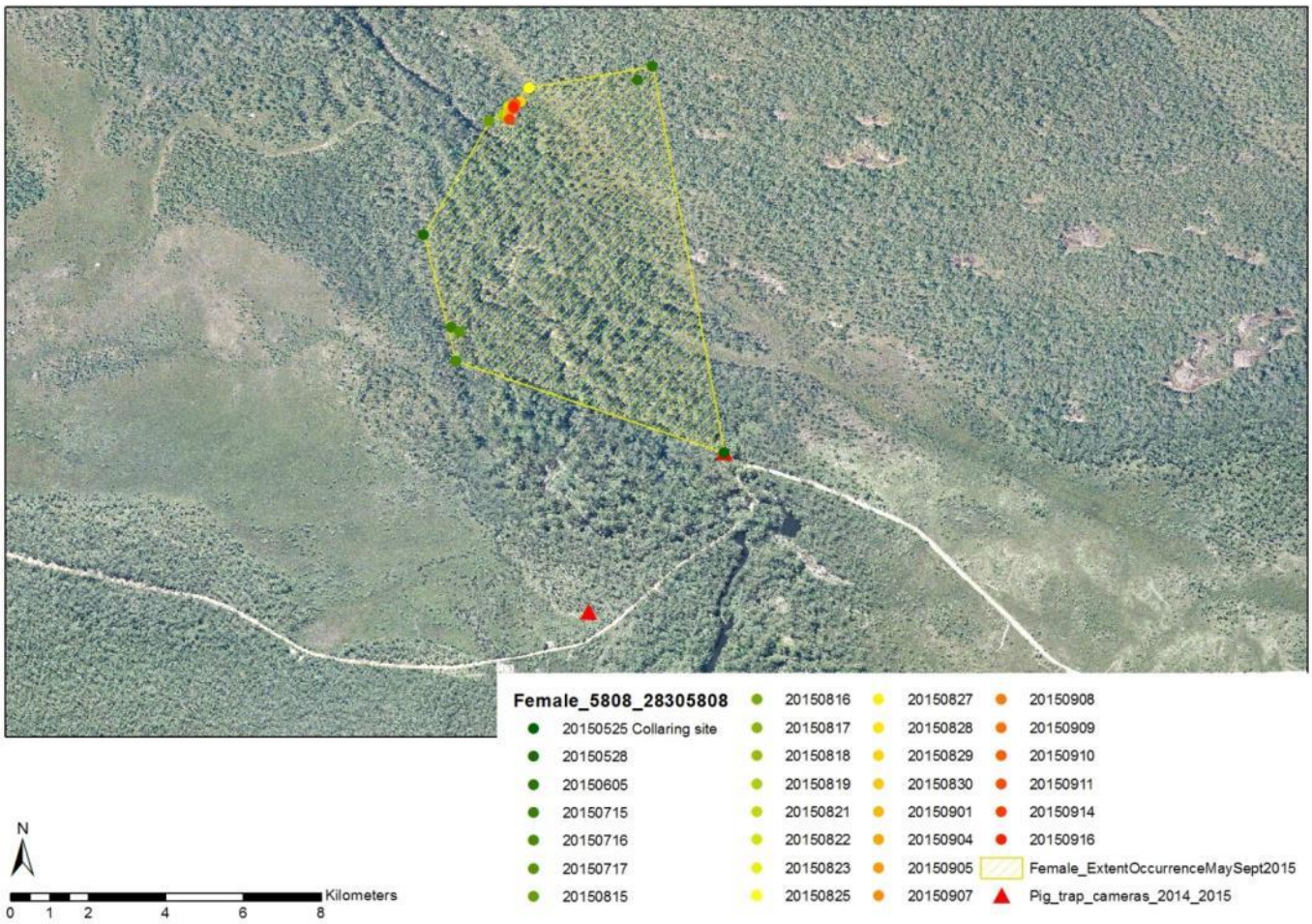

Figure 10: GPS data from the collared female pig from May to September 2015.

2.4 Survey of critical habitat

A major component of the South Coast NRM-funded project was the protection and monitoring of critical habitat, both where pigs have impacted previously, and where pigs have not been detected but have the potential to occur. 76 survey points (many of these were monitored annually) were monitored by staff from the Walpole and William Bay work centres. These points were prioritised to pre- and post- prescribed fire, and post-bushfire to enable a comparison of pig occurrence and damage caused post-fire once the habitat is opened up, making it easier for feral pigs to penetrate, wallow and dig. Surveys searching for feral pig evidence and damage covered 11,911km by vehicle, and 328km by foot over the project duration.

2.5 Satellite collaring project

This project was complemented by an aligned project with the South West Catchments Council, whereby feral pig control was topped up with additional funds for work west of the Frankland River, largely in the Pingerup plains area where *Reedia* populations occur, and along parts of the Shannon River. This project also included the trial and deployment of satellite collars in a joint research partnership with Murdoch University, to determine the use of habitat, movement and behaviour of feral pigs in the southern forests.

The project also included a trial of Forward Looking Infrared (FLIR) photography to determine whether it could be used to estimate the abundance and distribution of feral pigs in the southern forests, including under near-closed canopy, to provide better data on the number of feral pigs and enable control programs to become more targeted and efficient. Four pigs were collared in the Northcliffe area in late 2014 and the satellite data showed large movement of one boar, with the sows tending to remain within a narrower range of habitat. All animals were affected by the Northcliffe fires in February 2015, with three pigs perishing in the fire, and the fourth considered to have died just prior.

As most of the area that was chosen for the trial project was burnt by the wildfire, the trial was then moved into the SCNRM region, with the area near the Kent River and Basin and Nornalup Roads being used. A combination of boars and sows were trapped and collared near this area, and a UAV was flown in May 2015 to fly over the area where the pigs were known to occur. Unfortunately a technological glitch in the UAV and its camera impacted the trial, and coupled with the limited distance that the UAV can fly under CASA regulations, it was not deemed a success under this collaborative project.

Figures 11 & 12: Trial of the UAV with thermal sensor camera to locate collared pigs.

2.6 Peat rehabilitation project

Frankland District and Warren Region staff have also contributed to a joint project with the Walpole Nornalup National Parks Association, Walpole Primary School, the Department of Corrective Services (Walpole Workcamp) and Parks and Wildlife, with funding from State NRM to trial various rehabilitation techniques to protect and restore two key peat systems which have been severely impacted by feral pigs but still support a *Reedia* and a Sunset frog population.

Peat based systems are particularly under threat from feral pigs and the cumulative impact of a drying climate and increased risk of fire. These organic systems support a wide diversity of flora and fauna associated with swamp systems, including the Sunset frog and the critically endangered sedge *Reedia spathacea*. Its damp low-lying nature, and the root systems and underground plant storage organs of the vegetation makes it a landform frequently targeted by feral pigs at many times of the year.

The unburnt vegetation is very dense which can preclude feral pigs, but post-fire the area becomes much more accessible with feral pigs having access to the ground surface to wallow and dig for roots, tubers, corms and bulbs. Once the soil surface has been turned over by pigs and exposed to rapid oxidation, heavy metals and acids including sulphuric acid are released. The rapid formation of acidification alters the ecology of the system, changing microclimates and habitats particularly for invertebrates and amphibians. The increased acidity can render the soil sterile for several years and even decades, with little to no plant recruitment observed in several burnt peat swamps 15 years post fire.

Figure 13: Feral pig damage incursion approximately 2 weeks after fire, causing damage to fragile root systems

Figure 14: Peat system in which a population of Sunset frogs occurs, with very sparse revegetation a decade post-fire

Peat is flammable when dry, and once the peat layer has ignited, it can burn for months, smouldering in low oxygen conditions, which is extremely difficult to suppress. Whilst fire would have naturally occurred in these systems, the subsurface moisture levels are likely to have been higher than they have become in the last 40 years with sustained reduced rainfall, and the peat layer is less likely to have burnt to depths that are currently common now.

Our input in the peat rehabilitation project has included supervising the construction of a fence to prevent pigs accessing a *Reedia* population, planting and mulching seedlings, monitoring condition of *Reedia* and assisting with analysing hydrology and soil chemistry.

2.7 Education and media

Education is critical to building the awareness of the damage caused by feral pigs, to encourage members of the public to report feral pig sightings, and to discourage the deliberate release of feral pigs into bushland. There is a substantial problem with illegal pig hunting within the Walpole Wilderness, with hunters commonly encountered by field staff, and evidence of their presence recorded regularly. Maintaining a regular presence in the field and providing information on the impact that illegal hunting has on the success of coordinated trapping programs is key to combatting this issue.

Posters and staff were present at the Walpole Easter Markets in 2014 and 2015, and the Great Southern Science forum in 2014. A media release regarding the impact of pig damage on threatened flora and fauna was released to the Walpole Weekly and published in September 2014. Subsequently we were interviewed by ABC Radio Great Southern (16 September) and ABC Radio National (15 October). ABC TV News WA ran an item on the pig control program and impact of pigs, airing on 27 September 2014. We invited staff from SCNRM to attend the filming in Walpole, but unfortunately they were not able to attend. Denmark Bulletin also ran a story on 23 October 2014. We developed a media release on the trial Judas pig project in early June 2015 and radio and print media again showed a strong interest in the damage caused by feral pigs - we were interviewed by the Denmark Bulletin and ABC South West and Great Southern, and FM Network. Information was published in the Walpole Nornalup National Parks Association's newsletter and on the Denmark Vet Clinic's website.

We also drafted a public information brochure on feral pigs in the Walpole Wilderness entitled '*What is that Feral Pig up to?*' which SCNRM provided input into and was printed in August 2015 and distributed to a wide range of groups, including motorbike, mountain biking, walking and community organisations.

3. Evaluation Questions

3.1 Impact

This project contributed to the protection of four EPBC listed taxa – the quokka, Walpole burrowing crayfish, Sunset frog and the *Reedia* sedge – against habitat degradation from the feral pig, a key threatening process under the EPBC Act. The Walpole burrowing crayfish and Sunset frog have a limited range within approximately 50km of Walpole, and their habitat is targeted by feral pigs due to its moisture content. The control and removal of feral pigs also contributed to the protection of many other threatened and native flora and fauna species which are affected by feral pig activity.

Due to the cost and impracticality of covering the extent of the Walpole Wilderness, control effort concentrated on targeting pigs in threatened species habitat, including trapping, tracking using dogs and opportunistic control. Survey and monitoring effort has also been targeted to detecting pigs and analysing the severity of habitat destruction in these areas using standard techniques.

Across the duration of the project, 259 pigs were dispatched within the Walpole Wilderness by Frankland District staff, the LMDCFPEG and the SSAA. The removal of these animals will have had a direct and positive impact by reducing the risk of further damage at the sites where the pigs were located. However, as with control of most feral animals, removal needs to be constant to maintain or reduce the pig population at current levels as their reproductive rate is high. Frankland District, together with SSAA and LMDCFPEG, has been controlling feral pigs systematically for the previous five years. Reports from the LMDCFPEG indicate that the population of feral pigs at the interface of private property and conservation estate has reduced significantly since they began working in this area.

We carried out surveys at 76 points to detect sign of feral pig, which included a number of points where pigs had not been found previously, to gain an idea of the current extent of feral pigs in the Walpole Wilderness and to detect fresh pig sign that would enable us to target control works and.

Considerable effort was spent to control pigs in areas that had been burnt through bushfire or prescribed burn, as fire opens up the area and also some fire-responsive species are attractive to feral pigs. Pigs were noted in burnt areas less than two weeks after the burn.

Our ability to be present in these burnt areas constantly post-fire was impacted by the need for staff to continue to implement the department's burn program, and the intent to burn more areas to protect against bushfires has become more critical since the Northcliffe fire in February 2015. Particularly during this event, and for several weeks afterwards,

The working arrangements that have been developed with the LMDCFPEG and the SSAA are being used as the basis for a more formal arrangement between Parks and Wildlife and approved community organisations to carry out legitimate hunting and control on conservation lands.

Project funds have enabled us to contribute to the SWCC and Murdoch University's project to trial the use of FLIR cameras for feral pig distribution and abundance and increased knowledge of pig behaviour. Such trials will enable improved knowledge in the future for more strategic pig control.

The knowledge gained from the peat rehabilitation project will be integral to protecting and restoring sensitive peat ecosystems, which are highly susceptible to climate change in addition to degradation by feral pigs.

3.2 Effectiveness

The project delivered what was intended to be delivered, and met or exceeded its expected outputs. The details of the extent to which the objectives and outputs were met are outlined in the table below.

Objectives	Extent to which objective was met or reasons why it was not met
1. Conserving and protecting species and ecosystems	This overarching objective was achieved through the development of the coordinated program with Donnelly District, community groups LMDCFPEG and SSAA to identify working areas and standard operating procedures; by prioritising control and monitoring to threatened flora and fauna that are impacted by feral pigs, and by implementing these survey and control techniques throughout the project's duration.
2. 108,200 ha managed each year for presence of feral pig activity, and trapping and dispatch as needed	Over the project's duration, 260,909ha of the Walpole Wilderness from the Frankland River to the Hay River was managed for feral pigs. Trapping, tracking using dogs, opportunistic dispatch, survey to detect feral pig activity and monitoring of habitat degradation and impact of feral pig damage on threatened species and communities was regularly conducted in this area. The LMDCFPEG and SSAA also worked regularly within the Walpole Wilderness within their defined working areas for feral pig and other feral animal control. In 2013/14, surveys for feral pig evidence and damage covered 4,964km by vehicle and 168km by foot.
3. Follow up control (108,200ha) in 2014/15	Of the 260,909ha total area managed (which includes parts of the same area targeted in both 2013/14 and 2014/15), 115,770ha was surveyed, monitored and managed in 2013/14 and 145,140ha was managed in 2014/15. In 2014/15, surveys for feral pig evidence and damage covered 6,947km by vehicle and 160km by foot.
4. GIS data managed and supplied for all on-ground activity	GIS shapefiles and maps were supplied to SCNRM regularly through the project duration, as indicated in the Outputs section above.
5. 1 media article to promote EPBC species protection and/or feral pig monitoring and control results	Two media articles were developed and released in September 2014 and June 2015; we conducted four radio interviews; ABC TV News filmed a story in October 2014; and articles were published in two newspapers, one newsletter and two websites. We also displayed material at local markets and the Great Southern Science forum. A feral pig information brochure was produced in 2015.

3.3 Appropriateness (Methodology)

The control program aligns with the priority threat abatement actions listed in the *Threat abatement advice for predation, habitat degradation, competition and disease transmission by feral pigs (2013)*, including for selection of priority areas, collection of quantifiable data, and optimise management response for feral pig impact on threatened species and communities and the *Threat Abatement Plan for feral pigs (2005)*. The project also aligns with the recently published *Feral Pig Control Strategy: South-west Western Australia 2015 – 2020*, in particular in coordinating effort between government and community groups, prioritising focus areas to protect species and communities and to monitor and record effort of control and impact on habitat, flora and fauna.

Through this project, the Frankland and Donnelly Districts have worked with the South West Region of Parks and Wildlife and various vertebrate control groups (including the LMDCFPEG) to form Working Arrangements for the strategic and ethical control of feral pigs. These Working Arrangements will form the basis of ongoing MOUs with other approved pest animal control groups throughout the State, following on from the State Environment Minister's decision not to introduce a trial of recreational hunting in WA. These Working Arrangements also include Job Safety Analyses and Shoot Plans to reduce risk of incidents occurring and for safe working practices.

The use of tracking dogs proved very valuable in areas where pigs have become trap shy or have been frightened away from traps by illegal hunters or other visitors. The assessment and audit of tracking dogs, ensuring that only dogs which do not chase or harass wildlife or make control with feral pigs, was also implemented and will prove useful to other practitioners.

The Judas trial project has also provided useful data in the pigs' use of various habitat and their range of movement throughout the autumn and winter period. To date it has not however, formed an effective control method to locate other individuals for dispatch, as the male was found on its own, and the female had slipped the collar, possibly due to the actions of illegal hunters or other unknown factors. This project will, however, be continued by the District in 2015/16 with several other animals collared to further test its usefulness.

By working collaboratively with community groups and advisory groups such as the Southern Feral Pig Advisory Group, we can keep abreast of changes in best practice management, and implement new techniques as they are trialled and deemed to be effective.

3.4 Efficiency

As it was not feasible or cost-effective to cover large areas of the Walpole Wilderness, we targeted areas of highest conservation value to protect against feral pig damage.

Field staff searched for sign of feral pig whilst driving between set traps on their trapping runs, to achieve several goals simultaneously. Due to the animal ethics requirement to check set traps for animals daily, a large distance was covered on the trapping run and it was necessary to make the drive meaningful.

Trapping material was sourced from older traps where the design had been improved and the materials were then reused. Welding of trap doors was done in-house by Conservation employees to keep costs low.

Establishing an effective trapping program is by nature a lengthy and sometimes costly process, as areas need to be monitored for high levels of pig activity, uptake of free-bait and then the traps set. Illegal hunters also reduce the effectiveness and efficiency of trapping programs, by vandalising some of the traps, and disturbing areas and interrupting the pig's behaviour that cause it to become trap shy.

The tracking dogs are very useful in complementing the control program and reducing the dependency on traps. Having access to trained and assessed tracking dogs can be difficult if handlers are unavailable. There is a need for young dogs to come into the program continuously and learn from more experienced dogs. By working with a local contractor and the LMDCFPEG dog handlers have been able to work their dogs together, helping to train up younger or less experienced dogs.

Winter and spring rains delayed the start of the field program in both years, restricting access in Disease Risk Areas and other dieback susceptible areas. The pre-feeding and trapping of pigs during the 2014/15 season did not work particularly well. Spring rains delayed the start of the season as the abundance of water and fresh shoots in the wild reduced the take up of pre feed. Likewise, the early onset of autumn rains had a similar effect. During the driest part of the season when pre feeding and trapping is historically most effective, resources had to be diverted to combat a large forest fire in the Northcliffe area.

3.5 Legacy

Frankland District will continue to maintain strong partnerships with community groups that contribute greatly to feral animal awareness and control in the Walpole Wilderness. Working Arrangements with the professionally-managed community groups LMDCFPEG and SSAA will continue to coordinate feral pig control on the private property interface, and along key riparian systems. This also includes a comprehensive Shoot Plan and Job Safety Analyses to continue operations safely an ethically. These Working Arrangements and Shoot Plans will be reviewed annually by the Region and District staff, and the Forest and Ecosystem Management Division who coordinate feral animal management within the department.

Ongoing control is necessary to continue to reduce the pressure on threatened flora and fauna populations from feral pig activity. It is crucial to continue to monitor areas where feral pigs are not known to currently occur but have the potential to occur, to ensure that the distribution of feral pigs across the landscape does not increase.

Parks and Wildlife is responsible for conservation of flora and fauna, and will continue feral pig control and monitoring over its reserve system within the Frankland District, prioritising areas of high conservation value habitat and known hotspots for feral pig activity, including peat swamps, granite outcrops and river systems. The District has also reviewed the Feral Pig Operations Guide for 2015 to ensure that standard operating procedures for euthanasia, monitoring and survey are current and represent best practice. Monitoring of survey points to assess pig damage, particularly in areas planned to be burnt, and post-fire will continue and will be collated into the District's GIS systems, together with trapping and dispatch details.

The Warren Region/Frankland District has been fortunate to secure further funding from SCNRM in 2015/16 to support feral pig control within the Walpole Wilderness. The District and Region provides recurrent funding for feral animal control, including pig control, and pig control is considered a very high priority for the Warren Region for protection of threatened species and communities.

The District and Region is also very keen to continue to improve our knowledge and estimates of feral pig abundance and behaviour in the southern forests. Working with research groups such as university groups and invasive species councils to improve our knowledge so that feral pig control can be targeted and effort can be made as cost-effective as possible. Learning where feral pigs occur and move to across the seasons as resource availability changes, and how their diet changes and thus which plants, animals and ecosystems are under threat at which time of year continues to be highly important. The use of the FLIR camera on fixed-wing aircraft, funded by the District and Region, will occur in 2015/16.

The trial Judas project will continue, with plans to collar and track several more feral pigs during 2015/16 season to determine whether a Judas system is likely to be effective in the Walpole Wilderness.

Frankland District and Warren Region staff will continue to contribute to the joint project with the Walpole Nornalup National Parks Association, Walpole Primary School, the Walpole Workcamp and Parks and Wildlife, with funding from State NRM to trial various rehabilitation techniques to protect and restore key peat systems which have been severely impacted by feral pigs. Learnings from this project will be essential to continually improve our knowledge and management of natural systems, and to implement new techniques to restoration and protection.

4. Project Learnings

Ongoing control is necessary to continue to reduce the pressure on threatened flora and fauna populations from feral pig activity. It is crucial to continue to monitor areas where feral pigs are not known to currently occur but have the potential to occur, to ensure that the distribution of feral pigs across the landscape does not increase.

The use of detection dogs in pig control is a vital control option in dealing with trap shy or elusive pigs. It is also the most effective option for pig control during the wetter months when pigs are reluctant to pre-feed. By working in

with community control groups with access to well trained dogs, the Department was able to improve its detection and control of feral pigs.

The Northcliffe fire in February 2015 had a significant effect on the capacity of field staff to carry out feral control during the fire event which lasted for several weeks. All District and regional staff were directed to support the fire control effort, and consequently feral pig control was not carried out for the month of February and into early March. The region submitted a recovery plan which included survey and monitoring for feral pigs as well as fox baiting and other remedial works in the 98,000ha fire ground.

In 2015/16 we will be directly contracting the LMDCFPEG as well as local contractor Rodney Leggerini to conduct feral pig control in periods where District staff are fully expended combatting bushfires.

Losing the satellite collared pigs to the Northcliffe fire that were part of the joint Murdoch University and SWCC project also meant that several pigs within the SCNRM region were eventually collared and have been contributing to knowledge of the range and habitat occupancy of feral pigs within the area of the Frankland River to the Hay River.

Results from the trial peat rehabilitation project will be essential to improve our knowledge and management of sensitive peat-based systems, and to implement contemporary best practice techniques to protect and restore.

5. Future Recommendations

Frankland District needs to maintain strong partnerships with community groups that contribute greatly to feral animal awareness and control in the Walpole Wilderness. The Working Arrangements with the professionally-managed community groups LMDCFPEG and SSAA, including the Shoot Plan and Job Safety Analyses should be reviewed annually by the Region and District staff, and the Forest and Ecosystem Management Division who coordinate feral animal management within the department.

Ongoing control is necessary to continue to reduce the pressure on threatened flora and fauna populations from feral pig activity. It is crucial to continue to monitor areas where feral pigs are not known to currently occur but have the potential to occur, to ensure that the distribution of feral pigs across the landscape does not increase.

The District and Region is also very keen to continue to improve our knowledge and estimates of feral pig abundance and behaviour in the southern forests. Working with research groups such as university groups and invasive species councils to improve our knowledge so that feral pig control can be targeted and effort can be made as cost-effective as possible. Learning where feral pigs occur and move to across the seasons as resource availability changes, and how their diet changes and thus which plants, animals and ecosystems are under threat at which time of year continues to be highly important. The use of the FLIR camera on fixed-wing aircraft, funded by the District and Region, will occur in 2015/16.

Monitoring of survey points to assess pig damage, particularly in areas planned to be burnt, and post-fire should continue and be collated into the District's GIS systems, together with trapping and dispatch details.

Understanding the extent and classification of organic soils, particularly peat based systems, across the District is a key requirement for protecting and managing these systems, and to reduce the damage caused by feral pigs. Desktop mapping, and ground-truthing and classification of these ecosystems is necessary.

The trial Judas project will continue, with plans to collar and track several more feral pigs during 2015/16 season to determine whether a Judas system is likely to be effective in the Walpole Wilderness.

Frankland District and Warren Region staff will continue to contribute to the joint project with the Walpole Nornalup National Parks Association, Walpole Primary School, the Walpole Workcamp and Parks and Wildlife, with funding from State NRM to trial various rehabilitation techniques to protect and restore key peat systems which have been severely impacted by feral pigs.

6. References

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Woolnough A.P., Gray G.S., Lowe T.J., Kirkpatrick W.E., Rose K. and Martin G.R. 2005. 'Distribution and abundance of pest animals in WA: a survey of institutional knowledge.' Vertebrate Pest Research Section, Department of Agriculture WA.

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7. Attachments

a. *What is that Feral Pig up to?* public information brochure

b. *FeralPigStatement8JuneFinal* media statement

c. *WalpoleWeeklyArticle_Sept14_Final* media statement

d. *Walpole Weekly_September 3rd, 2014*

e. *Denmark Bulletin_Oct14*

f. *Feral_Pig_Poster_Final_NewLogo* poster

Where do feral pigs live and what damage can they cause?

Feral pigs are the descendants of domestic pigs (*Sus scrofa*), which were first brought to Australia by early European settlers. Feral pigs cause a range of agricultural and environmental damage in Western Australia so control measures are important.

Pigs are not native to Australia. Domestic pigs were often allowed to range freely to forage for food in the bush and some inevitably became feral, living and breeding in the wild. Accidental or deliberate introductions of domestic pigs into the wild continue even today (Source: DAFWA, 2015).

Pigs need water to regulate their body temperature as they cannot sweat.

Feral pigs can be found in swamps, wetlands and forest areas of the lower south-west of WA. In wetter months they can be found in forests and woodlands, but in summer their movement is restricted by limited access to water. After a fire, plant roots and soil fungi are easier to access making foraging easier for pigs.

Pigs are intolerant to heat and are restricted to areas where there is ready access to water including:

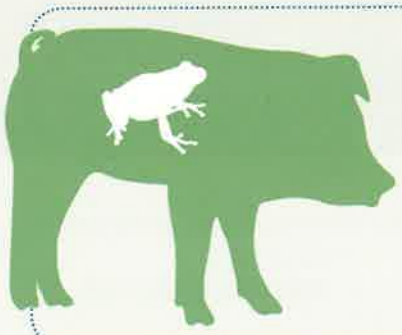
- creeks and rivers,
- swamps and wetlands, and
- constructed water points.

Damage to the environment caused by pigs can be irreversible. They can damage plant and animal habitat, introduce weeds, expose acid sulphate soils and introduce Phytophthora dieback.

Phytophthora dieback is a water mould that attacks the roots of susceptible plant species. It is one of the greatest threats to biodiversity in WA. It affects 40 per cent of the native flora of the south-west (more than 2,300 species).

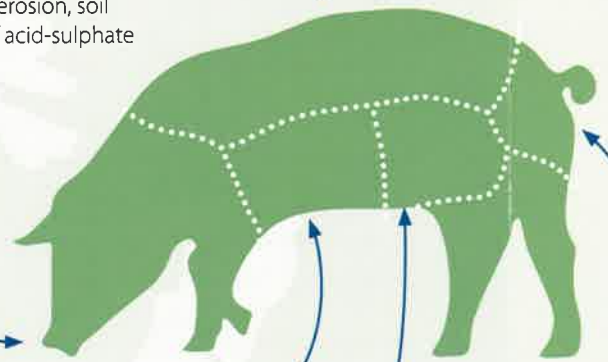
Acid-sulphate soils are naturally occurring, but they are usually covered over by plants and the soil surface, and acid is produced very slowly. When these soils are exposed by wide-scale digging by large animals or human activity, oxygen reacts with the soil to produce sulphuric acid. Heavy metals may also be released. The high acidity can kill plants and sterilise the soil, preventing the germination of new plants.

Back and hooves: Digging and wallowing damages fragile stream and river beds turning them into a muddy mess. Studies by Murdoch University in the northern jarrah forest have shown that pigs can dig about 1,500 tonnes of soil per pig per year.



A pig captured north of Denmark by the Parks and Wildlife was found to have 23 undigested frogs in its stomach.

Mouth: Adult pigs will eat up to 15 per cent of their body weight daily. They use their mouths to root around and dig up vegetation around rivers and streams causing death of plants and loss of regenerating plants, erosion, soil loss, and exposure of acid-sulphate soils.



Reproduction: In two years, one sow can produce up to 50 piglets, of which the females will be able to breed after 6-8months. Puberty can be brought on earlier by exposure to a boar.

Stomach: Pigs are omnivores and eat a wide variety of plants and animals, including reptile and bird eggs, baby birds, frogs, invertebrates, freshwater mussels, turtles, fungi, fruit, seeds, roots, and plant foliage. Feral pigs are also an agricultural pest as they eat young lambs, crops and destroy pastures.

Internal: Pigs carry diseases that can impact humans and livestock. Diseases such as pseudorabies, swine brucellosis, tuberculosis, bubonic plague, tularemia, foot and mouth disease, hog cholera and anthrax can be carried by pigs. Internal parasites include kidney worms, stomach worms, round worms and whipworms.

Faeces: Pigs eat a lot of dirt as they wallow and dig through soil, some of which contains Phytophthora dieback. Dieback is still viable after passing through the pigs' stomach and so they may spread dieback through their faeces.

Above Albany pitcher plant (*cephalotus*)

Plants and animals living in areas that pigs invade and damage are:

- orchids
- pitcher plants
- quokka
- sunset frogs
- Walpole burrowing crayfish

Many other species are threatened by pigs by:

- being a source of food
- damage to their habitat, and
- the infectious diseases they spread.

What is Parks and Wildlife and its partners doing about pigs?

Parks and Wildlife, together with South Coast Natural Resource Management (NRM) and the South West Catchments Council, is using targeted feral pig control measures in areas where threatened fauna, flora and ecosystems are at risk throughout the Walpole Wilderness. Activities include:

- Pig activity is monitored through foot and vehicle surveys and remote sensing cameras.
- Traps are set near waterways and threatened plant and animal populations where there is evidence of pig activity and checked daily.
- Pigs are tracked (sometimes using dogs) and humanely euthanised.
- Pigs stomach contents are being checked to develop a more indepth understanding of which plants and animals are most affected by pigs.
- In association with South Coast NRM and the South West Catchments Council, information is circulated to increase public awareness.

Below left Quokka **Below right** Sunset frog. *Photos –Grant Wardell-Johnson*

Above Blue lady orchid (*Thelymitra crinita*)

The **Lake Muir/Denbarker Community Feral Pig Eradication Group** and the **Albany Branch of the Sporting Shooters Association of Australia** work closely with Parks and Wildlife to coordinate pest animal control strategically. These groups focus on pigs that are active on private property, the interface with conservation estate and along significant river systems.

How can you help?

- You can assist the control program by reporting sightings of feral pigs to your local Parks and Wildlife office. Provide a record of the nearest road intersection, date and any distinct colours or markings on the animal.
- You can also report sightings of threatened fauna, such as quokkas, bandicoots and quolls to your local Parks and Wildlife office.
- Please be aware that hunting feral pigs in national parks and nature reserves is not permitted unless you are an authorised member of a registered group.
- Dispatch of feral pigs on private property can only be carried out humanely in accordance with the *Animal Welfare Act (2002)*, with permission of the land holder and by a current firearms license holder.

Department of Parks and Wildlife

PARKS FOR PEOPLE

SOUTHCOAST

SWCC south west catchments council

Information current at August 2015.
This information is available in alternative formats on request.

Department of Parks and Wildlife

PARKS FOR PEOPLE

What is that Feral Pig up to?

Did you know the damage caused by feral pigs is a major threat to Australia's biodiversity?

8 June 2015

Media Statement

Feral pig project in Walpole Wilderness

The Department of Parks and Wildlife is running a unique project to control feral pigs in the Walpole Wilderness – part of an international biodiversity hotspot that contains tingle forest and threatened plants and animals found nowhere else in the world.

Parks and Wildlife Frankland District officer Glenn Ewing said feral animal control was a key priority in managing the area and the district had come up with an innovative solution to assist with pig control.

“Feral pigs have a significant impact on the Walpole environment with their feeding and wallowing affecting vegetation structure, soil integrity and threatened plants and animals,” he said.

“In addition they are a potential conduit for exotic diseases.”

During April and May 2015 Parks and Wildlife officers, with the help of Richard Reynolds from the Denmark Veterinary Clinic and David Edmonds from the Walpole Nornalup National Parks Association, successfully trapped and collared a boar weighing approximately 50kg and a sow weighing approximately 45kg.

“The pigs were captured as part of plans to use them as tracking devices to lead us to other locations of other feral pigs with the intention of controlling these feral animals,” Mr Ewing said.

“The data gained from radio-tracking the pigs will provide valuable information on feral pig movements and help us better understand feral pig behaviour leading to more effective methods of controlling them.”

Mr Ewing said an aircraft from Great Southern Aviation would be used to help pinpoint the location of the collared pig and keep a track of its movements.

The project is a partnership between the Department of Parks and Wildlife and South Coast Natural Resource Management, and receives funding from the Australian Government.

Media contact: Parks and Wildlife Media 9219 9999
Facebook: www.facebook.com/dpawwa
Twitter: @WAPARKSWILDLIFE

Government of Western Australia
Department of Parks and Wildlife

2 September 2014

Media Statement

The problem with pigs…

You may be aware that the Walpole Wilderness has a problem with pigs! Feral pigs are the descendants of domestic pigs, first introduced into Australia by European settlers, and have become an increasing problem in national parks and other areas of bushland, where they cause significant damage.

Pigs can destroy fauna habitat, eat a wide variety of plants and animals and introduce dieback. Damage to the environment caused by pigs can be irreversible.

Dieback is a disease which attacks the roots of susceptible plants and eventually kills them. In the south-west up to 40 per cent of our flora - up to 2,300 species - is susceptible to dieback. Pigs carry large amounts of soil as they move through the bush and may transport dieback into areas where it did not previously occur.

In the summer, pigs move into wetlands and river systems and churn up the soil, causing erosion and contamination. In wetter months they may be found in forests and on granite outcrops, where they can cause significant damage to the sensitive mosses and lichens which grow in these areas.

Park and Wildlife conservation employee Nic Slatter said peat swamps were under particular threat from pigs.

“The Walpole Wilderness is lucky to have one of the most extensive areas of peat in the state,” he said.

“These ancient systems have developed over thousands of years, with organic matter building up to support plants and animals that would not survive elsewhere, including the beautiful and endemic sunset frog, and the endangered Reedia plant.”

The Department of Parks and Wildlife, together with community organisations like the Lake Muir / Denbarker and Northcliffe Community Feral Pig Eradication Group, the South West Catchments Council and South Coast Natural Resource Management, are working together to coordinate feral pig control by trapping, checking critical areas of fauna habitat for sign of pigs, and monitoring the damage caused by pigs.

Unfortunately in some areas, pig hunters have been known to introduce pigs into bushland. Please remember that introducing pigs and hunting in national parks and nature reserves is unlawful and people can be prosecuted for doing so.

“You can help the feral pig control program by reporting signs of suspicious activity in national parks to your local Parks and Wildlife office,” Mr Slatter said.

“You can also report signs of feral pigs and sightings of threatened fauna, such as quokkas, bandicoots and quolls.”

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DENMARK BULLETIN

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Spirit of Peace

Feature – centre spread Program of events – insert

Pigs wreak havoc

UP to 5000 feral pigs are wreaking havoc in the Walpole Wilderness, uprooting peat, killing and endangering plants, animals and their habitats, and spreading dieback.

Shooters are known to introduce the pigs – descendants of domestic pigs introduced by European settlers - into the fragile ecosystem and then hunt them after flushing them out with dogs.

Shooters have also ripped up pig traps set up by the Department of Parks and Wildlife and have stolen $600 surveillance cameras.

The presence of the shooters has meant the pigs – an animal as intelligent as a dog – shy away from humans and have moved deeper into the 500,000ha wilderness.

The Parks and Wildlife conservation officer Nic Slatter said the peat swamps – part of ancient systems which have developed over thousands of years – were, in particular, under threat from the pigs.

The Walpole Wilderness had one of the most extensive areas of peat in WA, with organic material building up to support plants and animals that would not survive elsewhere.

• More page 3

Celebration to mark church milestones

Rev. Sue Lodge-Calvert will lead celebrations to mark the 100th anniversary of Denmark's Anglican Church being named St Leonard's and the 115th anniversary of its consecration on October 26. Full report Page 3. **Picture ALISON KERSHAW**

'Blip' highlights inlet risk

By PATRICIA GILL

A TEMPORARY 'blip' in the Water Corporation's treatment plant has highlighted the critical health and environmental risk of an inlet outflow to the Denmark community.

Sampling from the 500,000 litres of wastewater spilled last month from the treatment plant recorded only slightly elevated levels of faecal coliforms but demonstrated the fallibility of the existing system.

Shire community and regulatory services director Gregg Harwood says at present the health and environmental risk from a spill depends on the 'organic load' feeding into the plant.

But in the long-term, due to Denmark's growing population, organic loads would increase stretching the effectiveness of the treatment plant beyond its projected capacity.

"The Water Corporation always has competing priorities and the plant may not just get upgraded in 10-15 years time," he said.

But if the wastewater were diverted to a tree farm then the Corporation would recycle both the water and the nutrients from wastewater for irrigation purposes.

In the summer of 2011/2012 faecal solids were found on the inlet foreshore around the Rivermouth Caravan Park and the Denmark Yacht Club gazebo.

Robert Ohle takes a sample from the outflow creek.

This was before the $ 7 million treatment plant upgrade this year.

In December 2011 faecal coliform levels of 360 per 100ml were recorded at the caravan park foreshore; the acceptable level should not exceed 150 per 100ml.

Mr Harwood had at first disbelieved that faecal solids were present on the foreshore after hearing reports of them and accompanying smells.

"I thought it was impossible to have solid sewerage appearing that far down from the plant," he said.

In the last month's spill, the result of a failure in one of the chlorinators, faecal coliforms of 170 per 100ml were recorded.

"A temporary blip and far better than several years ago," Mr Harwood said.

"But once there's been a spill and it's dispersed that's it; with a tree farm the Corporation is tied to running the plant well.

"A failure at the plant will cause problems in the pipeline or in irrigation through blockages."

Mr Harwood said the second chlorinator at the upgraded treatment plant 'in theory' was a 'contingency measure' to treat the wastewater after it had left the storage tanks.

"But any failure in the system, particularly when the plant is under pressure, winds up in the inlet," he said.

Mr Harwood said the Corporation had vastly improved its communication with the Shire about spills since the 2011/2012 summer.

It now heard about spills more regularly and a half to one day afterwards; previously it took one to four days and in one instance the Shire heard of a spill from the Health Department.

A feral pig caught on camera by the Department of Parks and Wildlife.

Feral threat

• From page 1

These included the endemic sunset frog and the endangered reedia, a tufted perennial sedge.

In the summer, pigs move into wetlands and river systems and churn up the soil, causing erosion and contamination.

In wetter months they may be found in forests and on granite outcrops where they can damage the sensitive mosses and lichens which grow in these areas.

Pigs carry large amounts of soil and can spread dieback, the soil-borne disease which attacks the roots of susceptible plants and eventually kills them.

In the South-West up to 40 per cent of flora, about 2300 species, is susceptible to dieback.

DPaW, community groups, South Coast Natural Resource Management and South West Catchments Council are attempting to control pigs through trapping, checking critical areas of fauna habitat for signs of the animals, and monitoring the damage.

In the Frankland district feral pig control generally occurs from October to June each year, depending on weather and accessibility to the areas after the winter rains.

The pig control team conducts weekly trapping, along with vehicle and foot surveys.

All trappers working for the department and community groups are accredited, highly trained and professional firearms licence holders.

In 2013-14, DPaW staff dispatched 53 pigs in the Walpole Wilderness, and 36 were dispatched by community groups (89 total).

Mr Slatter said introducing pigs and hunting in national parks and nature reserves was not permitted.

He called on members of the public to report signs of suspicious activity in national parks to local Parks and Wildlife officers.

Mr Slatter also called for people to report signs of feral pigs and sightings of threatened fauna, such as quokkas, bandicoots and quolls.

Church milestones

DENMARK'S Anglican Church will celebrate the 100th anniversary of being named St Leonard's and the 115th anniversary of its consecration on October 26.

"We will be honouring the past, celebrating our present life, and looking to the future," Rev. Sue Lodge-Calvert said

As well as ministering to the spiritual needs of the community, current activities include administrating Anglicare's emergency relief in Denmark, and fundraising.

Through the Mustard Seed Op Shop and parish giving, $20,400 was raised in 2013 for local and international humanitarian aid projects.

Due to its golden ambience and excellent acoustics St Leonard's has also become a valued performance venue.

"From here, we can start to glimpse what tomorrow's needs might be and plan for them - a community of people who speak and attempt to live a gospel of inclusive love, challenging hope and ultimate peace will be very important in our future" Sue said.

Depending on government funding, future plans may include increasing community space, and improving facilities around the hall.

Restoration work to the church was recently completed with a $61,500 grant from Lotterywest and $8300 from parish funds and donations.

This work included a much-needed new roof, re-stumping, restoring rotten windows and repainting.

St Leonard's was built in 1899 as a Church of England Mission Church.

In 1914 the name St Leonard's was chosen by Bishop Goldsmith of Bunbury, perhaps because the saint established a community in the forest.

St Leonard (d. 599) was of noble birth but embraced a life of simplicity, living in a cell of branches in the mountainous forests of Limousin (France).

After assisting the Queen of Aquitaine through a difficult labour he was rewarded with the area of forest that he could travel around on his donkey in 24 hours.

In that area he founded the abbey and village of Noblac (now Noblat) and many prisoners that he helped to free came to start a new life as farmers there.

• More page 15

John and Elaine Wakka's garage and workshop/studio were destroyed by fire.

Quick action saves home

DENMARK artist Elaine Wakka insists she was 'not being brave' when she entered a burning building to remove a car with a full tank of petrol.

"I thought, if the car goes, then the house goes," she said.

Elaine and husband John's Harewood Road house didn't go, and, after a short stint in hospital with smoke inhalation and burns to her face and arms, she is reasonably happy with the outcome.

The fire on Tuesday last week destroyed a garage, workshop, studio and caravan.

"But it's all insured and I'll get a new studio," Elaine said.

By removing the car and keeping timber in the three-metre breezeway between their home and the outbuilding, Elaine was able to contain the blaze until eight fire units, three ambulances and two police cars arrived.

Feral Pigs in the South West

Values at Risk:

Threatened fauna habitat:

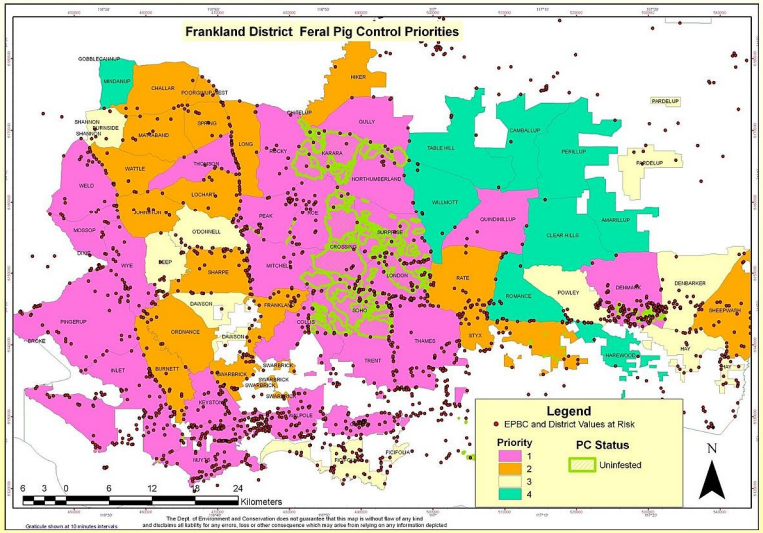
The Sunset Frog *(Spicospina flammocaerulea)* is found only in peat swamps within 20km of Walpole. The swamps are attractive to the pigs for wallowing, digging and feeding.

Threatened flora habitat:

Granites are particularly vulnerable to feral pigs due to the shallow moss beds and soil pockets that dry out readily when disturbed. *Verticordia fimbrilepis ssp. australis* (DRF) plants are uprooted or eaten.

Management:

Areas with threatened species and communities, endemic or locally significant species and significant dieback-free areas that are at risk from pigs are the highest priority for surveillance and control activities.



Threatened Ecological Communities (TECs):

Reedia *(Reedia spathacea)* occurs in waterlogged areas that are frequently disturbed by pigs. Large areas are uprooted as the pigs feed on the roots and apical shoots.

Quokka *(Setonix brachyurus)*

Fencing of Values:

Where pigs cannot be effectively controlled and values are at risk of extinction, fences are erected to protect critical habitat. These fences provide a unique opportunity for DEC to assess the impact of pigs and the ability of habitat to recover once pigs are excluded.

Pig Control:

Trapping and shooting are two control techniques used to remove pigs from areas of high value.

Judas Pig Trial:

The use of radio-collared pigs to locate other groups of pigs is an initiative started in March 2012. The technique will help to find remote and small remnant groups of pigs.

Government of Western Australia