

FERAL PIG MANAGEMENT PLAN

FLINDERS ISLAND

TASMANIA

Geof Copson

This management plan was prepared was funded by a Natural Heritage Trust Grant (Commonwealth ID 06588) through the National Feral Animal Control Program. The views expressed are those of the author and do not necessarily reflect those of the Commonwealth Government.



Natural Heritage Trust

Helping Communities Helping Australia

A Commonwealth Government Initiative



Tasmania

DEPARTMENT *of*
PRIMARY INDUSTRIES,
WATER *and* ENVIRONMENT

Contents

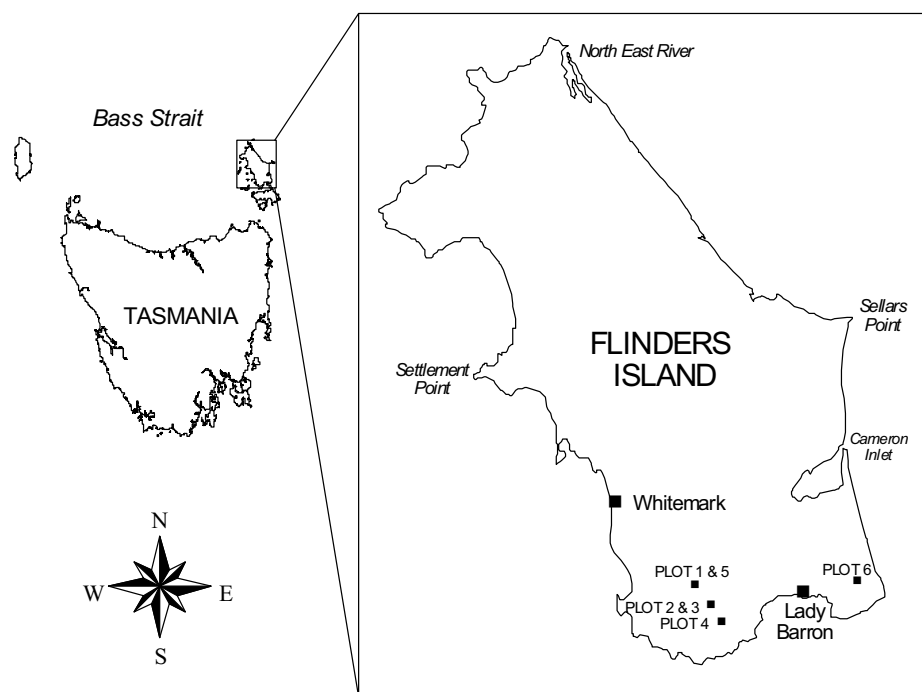
1	Introduction	3
	Background	3
	Initial field study	4
	Objectives of initial field study	4
	Distribution and abundance	5
	Monitoring program	6
	Economical considerations	6
	Control methods for local conditions	7
2	Management strategy and programs	8
	Objectives	8
	Oversight of management programs	8
	Feral pig control in the Strzelecki region	9
	Management actions (Objective 1)	9
	Initial reduction	9
	Ongoing control	10
	Monitoring feral pigs	10
	Monitoring flora and fauna	11
	Feral pig control in other areas of flinders Island	12
	Management actions (Objective 2)	13
	Ongoing control	13
	Monitoring feral pigs	13
	Monitoring flora and fauna	14
	Implementation	15
	Objective 1	15
	Objective 2	16
	Review of management plan.	17
	References	18

Feral Pig Management Plan Flinders Island – Tasmania

Introduction

Background:

Flinders Island is the largest island in the Furneaux Group, situated at the eastern end of Bass Strait (Map 1). The island is approximately 65 km from north to south and 40 km east to west. The highest point, the Strzelecki Peaks 782m, lies in the south western corner of the island. There are a series of wetlands and lagoons along the flatter east coast region.



Map 1 Flinders Island, Furneaux Group.
Long-term monitoring plots shown as number sites.

The island has a maritime climate with an average annual precipitation of 600-800 mm falling mainly between May and August. The average temperature is 17.6⁰C, ranging from a mean 13.6⁰C in the coldest months to 21.4⁰C in the warmest months.

Pigs became feral on Flinders Island in the 1800s after being released by sealers and following the ship wreck of the *City of Foo Chow* in 1877. This original stock was supplemented by animals

which escaped, or were released, in the 1970s. Currently their main distribution covers the Strzelecki National Park area in the southwest corner of the island, and through the wetlands along the east coast. In these areas 28 species of vascular plants are listed under the Tasmanian *Threatened Species Protection Act 1995* and several species of fauna are listed under that act and/or the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (Bryant and Jackson 1999; Threatened Species Unit, 2001).

Initial Field Study:

Objectives of Initial Study:

1. To survey in the Strzelecki National Park and surrounding area, feral pig numbers, distribution, seasonal movements and other aspects of pig biology.
2. To monitor over the long-term through plots, environmental indicators of feral pig presence including changes in plant diversity, and soil degradation and damage.
3. To measure the economic affect of feral pigs on agriculture and tourism, such as shooters.
4. To evaluate methods of control including using shooters and the involvement of indigenous people.
5. Develop a feral pig management strategy for the Strzelecki National Park and adjacent areas. Make recommendations on management in other areas of Flinders Island as appropriate.

An initial field study was undertaken to gather information for preparing a management strategy for feral pigs in the Strzelecki National Park region and recommendations on management in other areas of Flinders Island. During this study existing information, both collected data and anecdotal, was reviewed and sites were established for the long-term monitoring of feral pig abundance and damage, and alterations in the flora and fauna following pig control.

Feral pigs have been recorded in parts or all of several reserves on Flinders Island. Eradication or control of feral pigs is identified as a management issue in both the *Strzelecki National Park Management Plan 2000* and the *Wingaroo Nature Reserve Wingaroo Conservation Area Management Plan 2000* (Parks and Wildlife Service 2000a, 2000b). On the east coast they are found in wetland sites recorded in "A Directory of Important Wetlands in Australia" (Australian National Conservation Agency 1996) two of which are listed on the Register of the National Estate which are also registered as international Ramsar sites.

While the main focus of the field study was on the Strzelecki National Park and surrounding areas the information collected indicated that a whole island management approach to feral pigs will ultimately be necessary. This is based on the distribution of known rare and threatened flora and fauna species on the island, the development of small volume – high value crops and movements of feral pigs.

Distribution and Abundance:

Following a ground and aerial survey Statham and Middleton (1987) considered that there was a resident feral pig population of about 1,000 animals, with the highest density in the Strzelecki National Park. While they estimated densities of 3.0/km² it is extremely difficult to reach conclusions on absolute numbers of pigs in the Strzelecki reserve due to the terrain and dense vegetation.

The main concentration of feral pigs on Flinders Island is still in and around the Strzelecki National Park with a lesser, but still significant, population occurring throughout the wetlands of the east coast (Underwood, 2000; Map 2). Largely anecdotal evidence indicates that there are movements between the two populations but it is mainly from the Strzelecki region to the east coast. Such movements will inevitably cross agricultural land and while most animals may be destroyed during these traverses it also provides opportunity for them to damage primary production areas. Local seasonal movements occur with the commencement of winter rains with feral pigs generally moving down from the higher ground onto the private and Crown land surrounding Strzelecki National Park.

Anecdotal reports indicate that there has been a general decline in feral pig numbers in recent years. This could be due to the island experiencing extended periods of drought over several years. However, due to the potentially high reproductive rate of feral pigs a population has the capacity to recover quickly when conditions improve (Choquenot *et al.*, 1996).



Map 2 Area of Flinders Island where feral pigs have been most commonly sighted since the 1960s are shaded (no density is indicated).

Monitoring programs:

Six long-term monitoring plots were established as part of the project (Underwood, 2000). These were designed to provide information on the environmental impacts of feral pigs, the effectiveness of management programs, the recovery potential of the environment following pig control and the level of control required to permit and maintain this recovery. Four new and one existing plot are in, or adjacent to, the Strzelecki National Park. The other is on an east coast wetland site adjacent to Logan Lagoon Ramsar site (Underwood, 2000).

Transects to record pig sightings, damage and other signs were established in the Strzelecki National Park, along the Strzelecki Peak walking track, and on the east coast, adjacent to the Logan Lagoon and Syndicate Lagoon Ramsar sites (Underwood, 2000; Map 1).

Economical considerations:

The economic impacts of feral pigs were considered from two aspects, i.e. negative impacts due to environmental damage, primary production losses and the costs of control, and benefits through hunting and from potential commercial feral pig meat sales.

No detailed records of losses and control costs to primary producers were identified (Underwood, 2000). Feral pig damage varies significantly from year to year. While most landowners consider that losses are not generally significant estimates of annual losses ranged from \$ 1,000 to \$ 10,000. Costs identified with damage to pasture included reduced productivity, loss of perennial rye-grass and the spread of weeds. The stomachs of 50 feral pigs taken during the preliminary study all, contained vegetable matter. Root material occurred in 37 stomachs (22 with thistle roots), grain in three and carrion in eleven.

In recent years the farming of low volume, high value crops, e.g. cauliflower seed and poppy growing, has been developed on the island. To date these have not sustained pig damage but the crops have been grown in special areas to avoid this (Underwood, 2000). Such factors may limit the potential development of these and similar enterprises and should be taken into account when estimating costs associated with feral pigs and returns from control programs.

There is increasing evidence that rootrot fungus (*Phytophthora cinnamomi*), which is present on the island, may be spread by feral pigs (Choquenot *et al.*). The Nature Conservation Branch has a data base of known infection sites around the island. However these records are incomplete and further work in recording baseline data is required before any conclusions on the rate or cause of spread of the disease on the island can be made.

Commercial sports shooting of feral pigs has not been developed on the island and would be unlikely to be sustainable. Hunting carried out on the island is of recreational value to residents, with indirect financial returns through the purchase of equipment, ammunition, fuel etc. It would also contribute to feral pig control on the island thereby reducing costs to landowners.

The local abattoir is investigating the possibility of exporting feral pig meat from the island. Although the product by itself would appear to have a limited potential volume it may assist in sustaining a commercially viable game meat export market, utilising several species, from the island.

Control methods for local conditions:

The main methods of feral pig control on Flinders Island have been shooting, both recreational and for the protection of primary industry assets, and trapping. Both methods were successfully used during the field study and could be used for ongoing control in management programs.

Management Strategy and Programs:

Objectives:

- 1. To manage feral pigs within the Strzelecki National Park in order to prevent further degradation and permit the recovery of indigenous species, ecosystems and natural processes.**
- 2. Develop a feral pig management strategy to assist in the protection of conservation and primary industry values in other areas of Flinders Island.**

Oversight of Management Programs:

To be effective the management of feral pigs on Flinders Island will involve their control on private properties, leased and unallocated Crown land and on Crown reserves. It is therefore proposed that a Steering Committee is established to oversee the management program. Membership of the Steering Committee should include representatives from:

Parks and Wildlife Service
Primary producers on Flinders Island
Flinders Island Council
The Furneaux Field and Game Association

The Steering Committee may also include representatives from other organisations and/or bodies e.g. tourist operators, game meat producers, which they identify as having substantial interests in feral pig management on Flinders Island.

Feral pig control in the Strzelecki region (Objective 1):

Access for feral pig control within the Strzelecki National Park is very limited. While sections of the Trousers Point and Big River roads skirt parts of the western and southern sides of the reserve these would be of limited use for undertaking control work. Sections of the eastern side of the reserve and adjacent Crown land can be accessed from the Wallanipi track and a fire trail further to the east. The walking track up the Strzelecki Peaks can be used for surveys and monitoring but not for effective control work.

It is considered that given the terrain, vegetation cover, resources available and possibilities of future immigration it is not currently feasible to eradicate of feral pigs from the Strzelecki National Park. The preferred option is therefore a feral pig control program that will reduce and maintain their numbers to a level which will achieve Objective 1. The program will entail:

1. An initial reduction in the feral pig population through a large scale knockdown,
2. Continuous feral pig control to maintain the population at a level which will permit and maintain species and ecosystem recovery,
3. Monitoring variations in the feral pig population and distribution,
4. Monitoring changes in the status of impacted species and ecosystems.

Management actions – (Objective 1):

1. An initial reduction in the feral pig population in and around the Strzelecki National Park will be achieved through targeted poisoning. The need for any future large scale population reductions will depend on the effectiveness of ongoing control measure (2 below) and be based on data collected through the monitoring programs (3 and 4 below).
 - 1.1 In the Strzelecki National Park region bait sites, each containing a variable number of individual bait stations, will be set out at intervals along the Wallanippi Track both through the reserve and on surrounding unallocated Crown land. Where agreement can be reached with private landowners and/or leases the operation will be extended to tracks and areas on private land adjacent to the reserve in order to obtain a better coverage.

The timing of the large-scale knockdown operation will be in the period when the feral pigs move down from the highland areas, i.e. between April and October. Surveys are to be conducted prior to the free-feed stage of the program (below) in order to decide on the location, distribution and number of sites and bait stations. Where movement routes along gullies are targeted the bait stations must be located so as to avoid accidental contamination of streams.

- 1.2 Bait will be grain, pre-soaked in water and placed in plastic tub bait stations. Free-feed, non-poison bait, will be coloured with green food dye in order to reduce any take by birds. Poison bait, using 1080 as the active ingredient, will be coloured blue in order to distinguish it from the free-feed.

Free-feed bait will be presented at the bait station for eight to ten days immediately followed by three days of poison bait. During both free feed and poison bait periods bait will be presented in 20kg lots at each station. The bait stations will be checked daily and where necessary baits topped up with details of take being recorded. All bait stations will be removed at the end of the poisoning phase and any remaining poison bait destroyed.

Any signs of other species feeding at the bait stations must be recorded and reported daily to the program manager. During the poison bait phase of the program any vomitus in the vicinity of the bait station must be recorded, and cleaned up in order to reduce the chances of secondary poisoning.

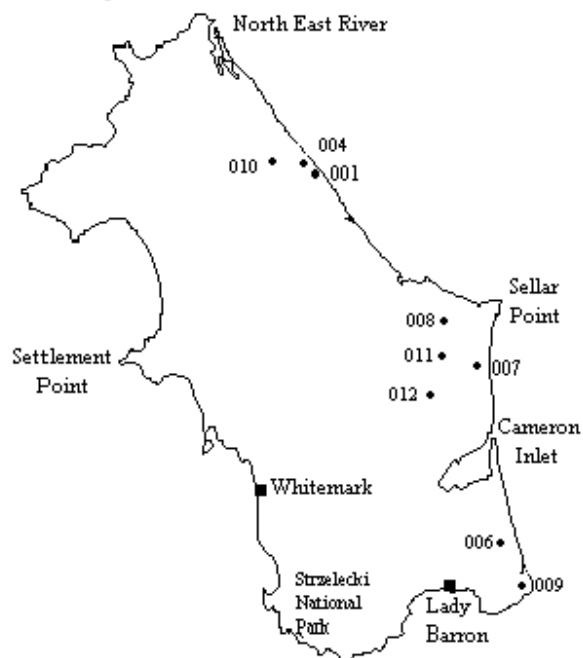
2. Ongoing control will be through hunting and trapping. The hunting would mainly be on Crown land, which is not a reserve, and/or on private land. As far as possible long-term control will be achieved through recreational shooting and the cooperation of the Furneaux Field Game Association will be sort in the planning and undertaking of this. Trapping may be used as an alternative or supplement to shooting, particularly if a market for wild boar meat is developed.
 - 2.1 Liaise with private landowners and the Furneaux Field Game Association regarding feral pig shooting operations.
 - 2.2 The use of Game Management Plans, incorporating feral pig control, on private properties adjacent to the reserve will be encouraged.
 - 2.3 Traps, used as a control method, must be checked at least every 24 hours and any animals caught must be removed or destroyed and disposed of. All handling and destruction will be in accordance with the “Model Code of Practice for the Welfare of Animals: Feral Livestock Animals”.
3. The terrain and vegetation cover within Strzelecki National Park make meaningful population counts of feral pigs very difficult. The population, monitoring program will therefor focus on signs including impact sites, e.g. dung counts, the level and extent of damage and the monitoring data collected in 4 (below) rather than trying to estimate feral pig numbers. The data collected will be used in guiding the current and developing future feral pig management strategies.
 - 3.1 Transects established in 2000 to record pig sightings and/or damage are to be monitored on an annual basis in April/May. Additional transects will be established in or adjacent to the Strzelecki National Park in order to monitor the effectiveness of the control program. The methods used are set out in Underwood, 2000.
 - 3.2 Starting ten days after a poison operation has been completed transects and areas adjacent to bait sites will be resurveyed for any fresh signs of pig activity.
 - 3.3 The recording and monitoring of feral pig sightings and/or damage by property owners and the public will be encouraged and assisted. This will be particularly important for collecting information on changes in distribution and levels of damage.

4. The impacts of feral pigs on the indigenous flora and fauna and the response of both indigenous and introduced species to pig control will be monitored. The data will be used to assess the effectiveness of the control program and in planning future management strategies. It will be essential in providing an indication of the level of control required in order to achieve Objective 1 of the program.
 - 4.1 Exclosures and control sites established in 2000 to monitor changes in the vegetation and ground dwelling invertebrate fauna will be maintained. The sites must be checked at least every six months to ensure that the exclosures are intact.
 - 4.2 The vegetation and invertebrate fauna at each monitoring site will be re-surveys at not be more than three yearly intervals. This will provide data on the rate of recovery of species and ecosystems including on seral successions, which can be used to evaluate impacts and/or recovery elsewhere. The methods used are set out in Underwood, 2000.

Feral Pig Control in Other Areas of Flinders Island (Objective 2).

Records of feral pigs on Flinders Island show a much wider distribution than the Strzelecki National Park (Statham and Middleton, 1987; Underwood, 2000). Map 2 shows the areas where pigs have been recorded in recent years, although many of these may only be occasional incursions. They are distributed at sites along the east coast from Logan Lagoon to approximately North East River Lagoon and are also impacting further inland in the Wingaroo area. A low level of migration of feral pigs, mainly from the Strzelecki region to the east coast, was reported by Underwood (2000).

Of particular concern is the impact of resident populations of feral pigs on the wetland habitats of the east coast (Map 3, Table 1).



Map 3 Listed important wetlands on Flinders Island:
after "A Directory of Important Wetlands in Australia (2nd edition)".

Legend: 001 Fergussons Lagoon, 004 Hogans Lagoon, 006 Logan Lagoon,
007 Sellars Lagoon, 008 Stans Lagoon, 009 Syndicate Lagoon,
010 Thompsons Lagoon, 011 Unnamed wetland,
012 Unnamed wetland.

The region has several areas recognised as important wetlands (Australian Nature Conservation Agency, 1996). Two of these are listed on the Register of the National Estate and are also internationally recognised as Ramsar sites. In addition the *Wingaroo Nature Reserve, Wingaroo Conservation Area, Management Plan 2000* (Parks and Wildlife Service 2000b) prescribes the control of feral pigs in the reserve in order to conserve native vegetation and flora. Several species found in the east coast region of Flinders Island are listed under the Tasmanian *Threatened Species Protection Act 1995* and/or the federal *Environmental Protection and Biodiversity Conservation Act 1999*, (Harris *et al*, in prep; Underwood, 2000; Parks and Wildlife Service 2000a; Parks and Wildlife Service 2000b).

It is considered that the initial management program should be continuous control. The need for localised intensive control operations in selected areas, e.g. the Wingaroo Nature Reserve and Conservation Area, The Patriachs, Logan Lagoon/ Syndicate Lagoon area, will be investigated and undertaken if justified. The program will entail:

1. Continuous feral pig control to maintain the population at a level which will permit and maintain species and ecosystem recovery,
2. Monitor variations in the feral pig population and distribution,
3. Monitor changes in the status of impacted species and ecosystems,
4. Assessment of the need for localised intensive control operations in selected sites which will be undertaken if justified by actions 2 and 3 above.

Management Actions – Objective 2:

1. Ongoing control will be through hunting and trapping. The hunting would mainly be on Crown land, which is not a reserve, and/or on private land. As far as possible long-term control will be achieved through recreational shooting and the cooperation of the Furneaux Field Game Association will be sort in the planning and undertaking of this. Trapping may be used as an alternative or supplement to shooting, particularly if a market for wild boar meat is developed.
 - 1.1 Liaise with private landowners and of the Furneaux Field Game Association regarding feral pig shooting operations.
 - 1.2 The use of Game Management Plans, incorporating feral pig control, on private properties will be encouraged.
 - 1.3 Where traps are used as a control method they must be checked at least every 24 hours and any animals caught must be removed or destroyed. All handling and destruction will be in accordance with the “Model Code of Practice for the Welfare of Animals: Feral Livestock Animals”.
2. The population, monitoring program will focus on signs including impact sites, e.g. dung counts and the level and extent of damage, rather than trying to estimate feral pig numbers. The data collected will be used in guiding future feral pig management strategies including the type, scale and timing of management operations.

- 2.1 The transect established in 2000 to record pig sightings and/or damage is to be monitored on an annual basis in April/May. Additional transects will be established by east coast wetland sites and on the Mount Boyes track and fire break in the Wingaroo Nature Reserve in order to monitor the effectiveness of the control program and identify any areas which may require more intensive control. The methods used are set out in Underwood, 2000.
 - 2.2 The recording and monitoring of feral pig sightings and/or damage by property owners and the public will be encouraged and assisted. This will be particularly important for collecting information on changes in distribution and levels of damage.
 - 2.3 The cooperation of landowners will be sort in collecting information on losses due to feral pigs and control costs.
3. The impacts of feral pigs on the indigenous flora and fauna and the response of both indigenous and introduced species to pig control will be monitored. The data will be used to assess the effectiveness of the control program and in planning future management strategies and will provide an indication of the level of control required in order to protect indigenous species, ecosystems, natural processes and primary industry assets.
 - 3.1 The east coast enclosure and control sites established in 2000 to monitor changes in the vegetation and ground dwelling invertebrate fauna will be maintained. The site, together with any new exclosures, must be checked at least every six months to ensure that the exclosures are intact.
 - 3.2 Further long-term vegetation and invertebrate monitoring sites will be established in east coast areas, particularly the Wingaroo and The Patriachs areas. These may be either exclosures with controls or marked transects.
 - 3.3 The vegetation and invertebrate fauna at each monitoring site will be re-surveys at not be more than three yearly intervals. This will provide data on the rate of recovery of species and ecosystems including on seral successions, which can be used to evaluate impacts and/or recovery elsewhere. The methods used are set out in Underwood, 2000.

Implementation:

Objective 1, Strzelecki National Park Region:

Action	Timing	Person days	Responsible body
<u>1. Initial feral pig reduction:</u>			
	April to October		
1.1 Survey of area (3.1 below)		2	PWS
Liaise with adjacent landowners.		6	PWS
Establishment of bait sites.			
1.2 Free feed period.		24	PWS
1.3 Poison operation.		9	PWS
Post poison clean up.		9	PWS
<u>2. Continuous feral pig control:</u>			
2.1 Liaison with landowners and hunters.	Ongoing		PWS/STC
2.2 Development of Game Management Plans.	Ongoing		GMU
2.3 Liase with landowners, hunters, commercial operators on trapping.	Ongoing.		PWS/GMU
<u>3 Monitoring feral pigs:</u>			
3.1 Establishing new transects.	2002-2003	4	PWS
Re-survey transects.	Annually April-May.	5	PWS
3.2 Post-poison survey.	10 days after poisoning operations completed.	5	PWS
3.3 Recording distribution and damage.	Ongoing with landowners and the public.	2	PWS
Coordination, data entry.	Ongoing with data analysis every 6 months.	1	PWS/NCB
<u>4. Monitoring vegetation/invertebrate fauna:</u>			
4.1 Maintenance of exclosures.	Every six months.	2	PWS
4.2 Re-surveys of sites.	Every 2-3 years.	10	NCB
Data entry/analysis.		5	NCB

Objective 2, Other Areas of Flinders Island:

1. Continuous feral pig control:

1.1	Liaison with landowners and hunters.	Ongoing		PWS/STC
1.2	Development of Game Management Plans.	Ongoing		GMU
1.3	Liase with landowners, hunters, commercial operators on trapping.	Ongoing.		PWS/GMU

2. Monitoring feral pigs:

2.1	Establishing new transects.	2002-2003	4	PWS
	Re-survey transects.	Annually April-May.	5	PWS
2.2	Recording distribution and damage.	Ongoing with landowners and the public.	2	PWS
	Coordination, data entry.	Ongoing with data analysis every 6 months.	1	PWS/NCB

3. Monitoring vegetation/invertebrate fauna:

3.1	Maintenance of exclosures.	Every six months.	2	PWS
3.2	Re-surveys of sites.	Every 2-3 years.	5	NCB
	Data entry/analysis.		3	NCB

4. Local intensive control operations:

4.1	Data analysis	April-May 2003	1	NCB
	Assessment of need for alternative control.	May 2003		STC

Legend: PWS – Parks and Wildlife Service; NCB – Nature Conservation Branch; GMU – Game Management Unit; STC – Steering Committee

Review of Management Plan:

The data collected during management actions and monitoring programs will be reviewed annually. In an adaptive management approach to the management operations annual changes may be made to the program, based on the reviews.

A major review of the program will be undertaken after five years of control operations. Such a review may be undertaken earlier if the monitoring programs indicate that this is necessary, or new techniques become available.

References:

- Australian Nature Conservation Agency. 1996.** A Directory of Important Wetlands in Australia Second Edition. ANCA, Canberra. 964 pp.
- Bryant, S. and Jackson, J. 1999.** Tasmania's Threatened Fauna Handbook. Threatened Species Unit, Parks and Wildlife Service, Tasmania. 426 pp.
- Choquenot, D., McIlroy, J. and Korn, T. 1996.** Managing Vertebrate Pests: Feral Pigs. Bureau of Resource Sciences, Australian Government Publishing Service, Canberra.
- Harris, S., Ziegler, K. and Arthur, C. In prep.** Cloud Forests and Fire Storms: The Vegetation of Strzelecki National Park, Flinders Island.
- Parks and Wildlife Service. 2000a.** Strzelecki National Park Management Plan 2000. Hobart. 69 pp.
- Parks and Wildlife Service. 2000b.** The Wingaroo Nature Reserve, Wingaroo Conservation Area, Management Plan 2000. Department of Primary Industries, Water and Environment, Hobart. 49.pp
- Statham, M. and Middleton, M. 1987.** Feral pigs on Flinders Island. Paper and Proceedings of the Royal Society Of Tasmania 121: 121-124.
- Threatened Species Unit. 2001.** Threatened Species Protection Order 2001: List of Threatened Species. Department of Primary Industries, Water and Environment, Hobart.
- Underwood, S. 2000.** The impact of feral pigs (*Sus scrofa*) on Flinders Island, Tasmania. Report to the Natural Heritage Trust. 37 pp.