



# Fraser Island dingo management strategy



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**Queensland Government**  
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Queensland Parks and Wildlife Service



## **Fraser Island dingo management strategy**

This report presents strategies for managing dingoes on Fraser Island. It is based primarily on Queensland Parks and Wildlife Service (QPWS) files and reports, a report by consultant Dr Laurie Corbett and information from discussions with QPWS staff. It also incorporates recommendations of a risk assessment report prepared in May 2001.

Landholders, local governments, interest groups, and members of the public including Aboriginal and Torres Strait Islander people were invited to comment on an earlier draft version of this strategy. The closing date for public submissions was 24 May 1999. Thirty-five submissions which raised twenty-three issues were received and considered by QPWS scientific and technical staff. Suggestions considered appropriate have been incorporated into this document. A subsequent version of the strategy was circulated for comment to members of the Fraser Island World Heritage Area Community Advisory Committee at their July 2000 meeting. In addition, members of the Fraser Island World Heritage Area Scientific Advisory Committee and Fraser Island World Heritage Area Management Committee were invited to provide comments on the revised draft. A further three submissions were received. The current document incorporates all appropriate comments from the second round of submissions.

Additional revision of this report took place following an incident in which dingoes attacked and killed a nine year-old boy on Fraser Island in April 2001. This tragic event dramatically redefined the risk that dingoes pose to humans and in so doing greatly altered the context of the management program. A risk assessment report subsequently produced by QPWS evaluated the level of risk in different locations on the Island, identified immediate site-specific options to reduce the risk and also made other specific management recommendations. This assessment supported the broad strategies that were being used to manage dingoes on the Island. However, as a result of the incident and the assessment which followed, a number of additional actions have been included within the strategies in this amended document to ensure that the dingo management program is more comprehensive.

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## 1 Summary

The dingo *Canis lupus dingo* is the Australian wild dog, a part of our natural environment. On Queensland national parks the dingo is protected as a native species and the QPWS has a legal responsibility to conserve these populations even though the dingo is a declared pest in this State. Most of Fraser Island is part of Great Sandy National Park.

Wildlife authorities recognise that because Fraser Island dingoes have not cross-bred with domestic or feral dogs to the same extent as most mainland populations, in time they may become the purest strain of dingo on the eastern Australian seaboard and perhaps Australia wide (Woodall et al. 1996). Therefore, their conservation is of national significance.

The number of visitors to Fraser Island has increased greatly in the last 10 to 15 years and visitation is year round. This has contributed to an environment where dingoes have changed their normal habits. Their more obvious and often close presence is a tourist attraction and a marketing drawcard. While most Island visitors recognise the dingo as a wild animal, the interaction between dingoes and people has become a serious management problem.

For example, dingoes have incorporated a significant component of human food into their diets. In seeking human food and at other times, dingoes have harassed and injured people and damaged property. That the most severe outcome, namely a human death, is possible was tragically demonstrated on 30 April 2001 by the fatal mauling by two dingoes of a nine year-old boy at Waddy Point. This incident starkly highlighted the urgent need for comprehensive measures for visitor safety to be taken to minimise the risk posed by dingoes. Such measures were identified in the document entitled *Risk Assessment: Risk to humans posed by the dingo population on Fraser Island* (EPA 2001) prepared in May 2001 in response to the catastrophic event the preceding month. The document provides direction for the management of dingoes on a site-by-site basis on Fraser Island and should be considered complementary to the present report which outlines a longer term, Island-wide dingo management program.

The overall objectives of this dingo management strategy are to:

- ensure the conservation of a sustainable wild dingo population on Fraser Island;
- reduce the risk posed to humans by dingoes at all recognised visitor nodes to an acceptable (low) level;
- reduce the frequency and intensity of aggressive and destructive behaviour by the Island dingoes towards visitors and local residents to the greatest extent practicable;
- reduce, and eventually eliminate, the incidence of deliberate and inadvertent dingo-feeding by visitors, residents and resort and island staff, and the availability of other sources of human food; and
- provide Fraser Island visitors with a safe, enjoyable opportunity to view dingoes in an environment as near as possible to their natural state.

Achieving these objectives requires a co-ordinated and integrated management response. The following strategies to manage dingoes on Fraser Island form components of that response:

### Strategy 1

*Comprehensive scientific research and monitoring will be undertaken to ensure the principles and practices of dingo management are sound.*

### Strategy 2

*Awareness programs will continue to encourage appropriate behaviour towards dingoes by Island visitors, residents and staff.*

### Strategy 3

*The dingo-human interaction will be managed by increasing Island-wide facilities and services that discourage dingoes from interacting with people and obtaining human food, and by prohibiting dingo feeding.*

### Strategy 4

*Programs will be implemented to modify dingo behaviour and habits which threaten human safety and wellbeing.*

### Strategy 5

*Any dingo identified as dangerous will be destroyed humanely using accepted methods after receiving appropriate approvals.*

### Strategy 6

*A cull to a sustainable level may be undertaken if research can show the population is not in balance with the seasonal availability of natural foods.*

### Strategy 7

*An ongoing program of monitoring and review will be conducted to assess risk levels at key visitor nodes across the Island and determine the effectiveness of dingo management strategies in maintaining these levels at an acceptable (low) level.*

Actions involving direct management of dingoes (culling or destroying individuals) should not need to continue indefinitely. The components of the overall strategy that will require ongoing implementation are those involving public education and measures to limit dingo-human interaction. If the latter are successful during the first few years of the program, controlling dingo numbers and problem dingoes should then only be a rare occurrence.

Local governments, tour operators and other private sector interests will be invited to support the strategies and actions through provision of services, participation in training and visitor education programs, liaison with QPWS staff or other relevant contributions.

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## 2 Introduction

Conserving dingoes on Fraser Island and reducing the incidence of negative dingo–human interactions depend on the application of a range of management strategies. The purpose of this management program is to document these strategies and to provide a means of informing the public about the diversity of issues affecting dingo management on the Island.

Managing populations of any wild species is both an art and a science in that it often relies upon the application of incomplete knowledge to achieve objectives while at the same time acquiring further systematic knowledge. Wildlife managers must recognise that the knowledge at hand has shortcomings and seek to improve it. In formulating a wildlife management strategy, factors to be considered include the degree of risk to the species involved, the time frame in which the program will operate, the legislative tools available, the practical difficulties involved and the level at which management will be directed.

The strategies set out in this management program will be implemented in a way which is dynamic and responsive to the changing nature of biological systems and flexible enough to adapt to unforeseen circumstances.

The dingoes of Fraser Island have significant conservation value because in time they may become the purest strain of dingo on the eastern Australian seaboard and perhaps Australia wide. Within the national park they are protected as native wildlife. Dingoes have also become an important tourism attraction and marketing drawcard for local, national and international visitors to Fraser Island. However, at times the high number of visitors interacting with the Island's dingoes has created problems. In the high visitor-use areas dingoes can lose their shyness and fear of people and in these circumstances some have developed aggressive tendencies and/or destructive behaviour.

To counter these problems, some strategies directed primarily at educating visitors about appropriate behaviour when dealing with dingoes were implemented (Twyford 1994a). Relocating animals on the Island proved unsuccessful. In 1998 several incidents, including attacks on two backpackers and an infant, attracted widespread media attention and public interest. Following these events, four dingoes were destroyed by Rangers. In response to this situation, Dr Laurie Corbett, a dingo ecologist with 30 years' experience, was engaged as a consultant to provide expert advice in managing the dingo population. This management strategy is based largely on Dr Corbett's recommendations.

The tragic death of a young boy on Fraser Island on 30 April 2001 as a result of a dingo attack focused attention on QPWS management of the Island's dingoes. The incident confirmed the risk that dingoes pose to humans and as a consequence significantly altered the required approach to dingo management.

The immediate response enacted over the five days following the event was the destruction of 28 animals that were habituated to humans and frequented areas heavily used by people. A further three dingoes identified as being aggressive were destroyed subsequently. In addition, a risk assessment was conducted to determine the level of risk to humans on the Island and to identify short term, site-specific management strategies that would reduce this level of risk.

This process was based upon standard risk assessment principles and methodology as outlined by the Joint Technical Committee OB/7 – Risk Management (1999). It considered existing management strategies, proposed actions in drafts of this and other management documents, new ideas and the opinions of leading experts and representatives of key non-government organisations. The purpose of this approach was to develop risk controls and strategies for the management of dingo/human interactions on Fraser Island.

The report prepared from this risk assessment (EPA 2001) sets the context in which the present strategy addressing Island-wide management directions should be considered. Importantly, all new management options identified during the risk assessment process have been incorporated into the current report such that the two documents act in concert with one another to provide for the long term management of dingoes on the Island.

A comparison of the risk levels between October and May 2001 for approximately 70 locations on Fraser Island, reflecting measures implemented during this period to reduce the risk dingoes pose to humans, is shown at Appendix A.

### 2.1 Legislative and management environment

Under the *Nature Conservation Act 1992*, the dingo is a species declared indigenous to Australia. Sections 17 and 62 of the Act provide for the legal protection of the dingo as a natural resource in protected areas such as national parks. Consequently, a dingo cannot be interfered with on a protected area unless the chief executive has granted a permit or authority. Elsewhere in Queensland dingoes are a declared (pest) species under s70(4) of the *Rural Lands Protection Act 1985*.

Most of Fraser Island is part of Great Sandy National Park and also the Fraser Island Recreation Area. It is also a World Heritage Area. Authority for management derives from the *Nature Conservation Act 1992* and the *Recreation Areas Management Act 1988*. The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* also has implications for the management of the World Heritage Area, including any wildlife within it. The Great Sandy Region Management Plan, approved by the Queensland Government in 1994, provides a whole of government approach to managing the Great Sandy Region which includes the Fraser Island World Heritage Area. The coastal boundaries are high water mark (Great Sandy National Park), low water mark (Fraser Island Recreation Area) and 500 metres offshore (World Heritage Area). The Maryborough and Hervey Bay City Councils are responsible for the townships and freehold title land.

Under the *Nature Conservation Regulation 1994*, a person anywhere in Queensland who feeds a native animal that is dangerous or capable of injuring a person can be issued with an infringement notice or be prosecuted. The maximum penalty for an offence is \$1500.

Under the *Recreation Areas Management By-laws 1991*, a person who feeds animals in a recreation area without the Recreation Area Management Board's authority or who fails to comply with a directive provided by sign can be issued with an infringement notice or be prosecuted. Staff can issue \$50 on-the-spot fines for offences.

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The common law duty of care requires the QPWS to address the safety of people entering and using the lands, water and facilities in the Fraser Island Recreation Area. The Management Plan recognises that measures can and will be reasonably taken in various circumstances to prevent harm occurring to visitors (Queensland Government 1994, p132). Draft EPA and Recreation Areas Management Board Risk Management Policy (derived from the Public Finance Standards 330 and 331, *Financial Administration and Audit Act 1977*) provides the basis for implementing strategies which will reduce the risk to the community. There is also a responsibility to provide a safe work environment for employees under the *Workplace Health and Safety Act 1995*.

The QPWS also has obligations to ensure that its management of dingoes is ethical and humane. The Chief Inspector of the Royal Society for the Prevention of Cruelty to Animals (RSPCA) visited Fraser Island in March 1998 to examine the welfare of the dingo population. The Chief Inspector indicated that while the dingoes were lean they were in reasonable condition (Byron Hall pers. comm. May 1998, see also Corbett 1998a, p8).

This dingo management strategy will not be implemented in isolation, but rather with due consideration for the aims and objectives of other components of the overarching Great Sandy Region Management Plan. The converse situation will also apply. Compatibility of actions and directions across the different facets of the Management Plan will ensure the protection of Fraser Island's world heritage values.

## 2.2 Natural environment and the dingo population

Because of its relative isolation from the mainland and its uniform and low fertility sandy soils, Fraser Island has a relatively low diversity of vertebrate terrestrial fauna, particularly mammals. The Island supports only two macropod species, the swamp wallaby *Wallabia bicolor* and the uncommon long-nosed potoroo *Potorous tridactylus*. Apart from bats the only abundant mammals are the native rodents, dingoes and possibly two species of bandicoot.

Wild dingoes living in packs are naturally lean animals partly as a consequence of the male dominance hierarchy that operates throughout the year and the secondary female hierarchy that exists during the breeding season (Corbett 1995). Within a pack there are dominant individuals, subordinates and 'scapegoats' at the lowest level of the hierarchy. Dominant animals frequently deny or limit subordinates access to food, even when supplies are abundant, and so most lower ranking individuals will always be lean (Corbett 1998a).

A dietary ecology study conducted on Fraser Island from 1992–94 indicated that 47 percent of a sample of approximately 1300 dingo scats contained human food. Other significant dietary items included fish (25.6 percent) and bandicoots (23.7 percent) (Twyford 1995). The scats were collected when open rubbish tips were still in operation and it is suspected that the consumption of human food by dingoes has declined considerably since. Nevertheless, human foods can be assumed to have allowed the dingo population to remain higher than the natural carrying capacity of the Island (Corbett 1998a, p8). This conclusion is supported by anecdotal evidence of two dingo packs with very small territories associated with the Orchid Beach Township and Waddy Point camping area (Corbett 1998a, p9). Corbett found that these dingo packs appeared to be particularly reliant on human foods and appeared not to require a large hunting territory.

Corbett (1998a) estimated that the Island's dingo population of 25 to 30 packs peaks at approximately 200 animals during whelping in June–July and declines during the next 10 months to about 100 animals when breeding recommences. With the exceptions of Orchid Beach Township and Waddy Point, territory and pack size show little variation.

## 2.3 Dingo–human interactions

### 2.3.1 Recognising the problem

The fact that Fraser Island dingoes can at times adversely affect the 'outdoor' experience sought by the visiting public and more importantly also affect their physical safety has been recognised for more than 10 years. The first well reported attack on a child occurred on Fraser Island in 1988. Dingo warning signs installed at Central Station and Lake McKenzie indicated that the animals were a significant management issue by 1989. Even 60 years before this, a report in a Maryborough newspaper mentioned a problem with dingoes on Fraser Island. One anecdotal report from an ex-forestry worker indicated that dingoes were taking food from forestry camps in the early 1960s.

Several visitor surveys strongly indicate that viewing and even interacting with dingoes is important and a positive experience for the majority of tourists and, on balance, the dingoes' benefits are perceived by many visitors to considerably outweigh their drawbacks.

In the past dingo management has tended to be reactive and periodic in response to seasonal increases in dingo aggressive behaviour. The issue of problem dingoes has been exacerbated by the increase in the number of visitors to Fraser Island from fewer than 100,000 in 1980 to over 312,000 in 1999/2000 (DEH and EDAW 1998, QRAMB 1999-2000). Perhaps more significantly, the seasonally steady number of campers to the Island provides a reliable year-round source of food for the dingo population.

Increased visitor numbers have seen a corresponding rise in interactions between dingoes and visitors. While over the long term there has been a general trend of increasing negative interactions, this trend is at times moderated by other influences related to dingo social structure, prey abundance and other natural factors. Nevertheless, the summer and Easter peaks in visitor numbers also coincide with those periods in the dingo behavioural cycle when incidents of aggression directed at people are most likely to occur. As a consequence of many generations of dingoes having regular and continuing contact with people, the animals have changed their natural habits, losing their fear and wariness and relying to varying degrees on people for food. At one extreme, a few animals obtain a significant portion of their diet from handouts provided by Island residents at resorts or townships, often sleeping under the houses of the residents. At the other extreme are those truly wild animals which are seen only rarely and which obtain food at remote beach campsites only inadvertently when patrolling their territories. Intermediate to these extremes are a number of dingo packs which have high visitor-use areas such as camping and/or picnic grounds in their territories.

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The nature, frequency and intensity of dingo interactions with humans varies depending on the age and sex of dingoes, pack size and composition, time of year, supplementary natural food supplies, and human reactions to dingoes. Aside from the dingoes seeking food, aggressive interactions can occur for other reasons, including:

- dingoes regarding humans as competitors or intruders into the dingo domain and thus defending 'hunting' areas (garbage transfer stations, campsites, barbecue areas, beaches), females in season and pups;
- dingoes (mainly adults) regarding humans (mainly children) as prey. This category also includes young dingoes learning and practising hunting skills: young dingoes through trial and error assess whether prey animals (dependent on size, age, health, species) are suitable to be hunted relative to the dingoes' existing hunting skills; and
- juvenile and sub-adult dingoes 'playing' with humans. People are incorporated into learning and practising dominance behaviour. Usually young animals practise their dominance and submission skills on each other. The subordinate animals respond appropriately so usually avoid serious injury. Humans unfortunately do not and will generally stimulate further aggression from the dingo by screaming, running and/or falling.

Visitor attitudes towards dingoes were included in a broader study conducted in 1995 by Beckmann and others (1996). The mailout-mailback approach of this survey generally precluded overseas visitors from responding. The study showed that:

- at least 10 percent of visitors reported a negative interaction with dingoes on their visit to Fraser Island, including harassment (especially of children), food theft and damage to property, particularly tents;
- only a fraction of the total number of incidents is reported to Rangers; and
- many respondents blamed inappropriate or illegal behaviour of other user groups, particularly overseas visitors and tour groups, for feeding the dingoes.

### 2.3.2 Types of incidents

Approximately 400 reports and evidence by Island staff indicate that dingo incidents can be divided into four categories:

#### Property damage and/or property loss

Dingoes have ripped tents, chewed camping gear, clothes and food containers and stolen food, clothing and other items. This behaviour usually occurs when the campers are absent although food theft is not uncommon when campers are present if food is left in the open and is readily accessible.

#### Harassment

Dingoes approach a person, most commonly a solitary child or woman, snarling, lunging and circling. On many occasions the dingoes appear to be playing, 'prancing' around the person in a manner similar to domestic dogs. This behaviour can precede a physical attack.

#### Nips and bites

The seriousness of the wounds ranges from grabbing without breaking the skin to serious and often multiple bites which have required sutures. The nature of the attack ranges from dingoes sneaking up and nipping a person previously unaware of the dingoes' presence to extreme cases of packs of dingoes chasing people into the sea, continuing to harass those people and then biting them when they leave the water.

#### Fatal attacks

The first dingo-related fatality occurred on Fraser Island on 30 April 2001 with the tragic death of a nine year-old boy. Two dingoes were involved in the attack near the Waddy Point camping ground.

### 2.3.3 Events leading to an aggressive interaction

The sequence of events leading to an attack by a dingo (modified from Marsterson 1994) can be summarised as: Attraction → Habituation → Interaction → Aggression

#### Attraction

Food is deliberately or inadvertently made available to dingoes. Deliberate feeding of dingoes includes hand-feeding at barge landings, picnic and campgrounds (usually small quantities of food scraps) and larger quantities at resorts and townships by Island residents. A small number of Island residents deliberately and regularly feed dingoes in their house yards. Anecdotal evidence indicates that deliberate feeding is not widely practised but does occur at Eurong, Happy Valley and Orchid Beach townships and at some businesses. Inadvertent feeding occurs when dingoes obtain garbage from dumpsters, bins, slovenly or careless campers, bait, fish offal and frames carelessly disposed of on the beaches and, most importantly, food stolen from campers' tents and food containers.

#### Habituation

This is a behavioural adaptation by a wild animal whereby a 'stimulus (a human presence) initially regarded as threatening may, if repeated without negative reinforcement, eventually become ignored' (Bolen and Robinson 1995, p112). This means that dingoes have lost their fear of humans because of beneficial, regular and continuing contact.

#### Interaction

In addition to the encouragement provided by food, some visitors will also attempt to get close to dingoes to pat them, take photographs and attempt to 'play' with the animals as if they were domestic dogs.

#### Aggression

Dingoes involve people in their feeding activities and behavioural development (Corbett 1998a, pp9,10) which can result in human injury or, in the worst case, death. The seriousness of the outcome can be exacerbated by the person responding in a way that will further excite or encourage aggressive animals.

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## 2.4 Strategies and objectives

The information above has guided the development of strategies to manage dingoes on Fraser Island.

These centre on:

- research;
- public education;
- managing human behaviour;
- managing dingo behaviour; and
- managing dingo populations.

The objectives of the overall dingo management strategy are to:

- ensure the conservation of a sustainable wild dingo population on Fraser Island;
- reduce the risk posed to humans by dingoes at all recognised visitor nodes to an acceptable (low) level;
- reduce the frequency and intensity of aggressive and destructive behaviour by the Island dingoes towards visitors and local residents to the greatest extent practicable;
- reduce and eventually eliminate the incidence of deliberate and inadvertent dingo-feeding by visitors and residents, and the availability of other sources of human food; and
- provide Fraser Island visitors with a safe, enjoyable opportunity to view dingoes in an environment as near as possible to their natural state.

A number of alternative management actions within the overall strategy were considered but rejected by Corbett (1998a) and QPWS management on the basis that they are unacceptable, not viable or unsustainable. Some are also at odds with existing legislation and management responsibilities. These rejected proposals include:

- establishing feeding stations to supplement the diet of those dingoes that are perceived by some people to be unnaturally malnourished;
- relocating elsewhere on the Island those dingoes that cause a serious threat to human safety and consequently may have been nominated for destruction;
- relocating such animals to the mainland (national parks, State forests or similar); and
- eradicating dingoes entirely from Fraser Island.

## 2.5 Principles underpinning the strategy

Formulation of this dingo management strategy was based on the following key principles which will also underpin the strategy's future implementation:

- With hybridisation threatening to bring about the eventual extinction of pure dingoes on the Australian mainland, preservation of the Fraser Island dingo population represents a unique opportunity to conserve the species in a near-natural environment.
- Dingoes are regarded as wild, native animals and should be interfered with as little as possible.
- Human life and safety issues are of overriding importance.
- Animal welfare and ethical considerations are similarly of major concern.
- Where information is lacking, management actions will seek to improve the database on which strategies can be developed.
- All research providing the foundation for future management actions will adopt a rigorous scientific approach and be subjected to peer review.

## 3 Research and monitoring of dingo biology and behaviour

Dingo monitoring programs in the past sought to learn about dingoes themselves as well as about dingo-human interactions (i.e. the number and nature of dingo incidents occurring on the Island). The first was initiated in 1992–1993 and was primarily in the form of random observations. That project was incorporated into an intensive monitoring program in 1994 and concentrated on determining the population size and dietary and behavioural ecology of dingoes in townships, and picnic and camping grounds (Marsterson 1994, Moussalli 1994, Price 1994 and Twyford 1994b). The dietary studies were based on analysis of dingo scats which only considered the presence-absence of various prey species and human-derived foods without providing estimates of the nutritional significance of the different food types. The program was established to determine the consequence of rubbish dump closures to dingoes and primarily to better define and clarify management options and actions.

Visitors have been unwilling to report dingo incidents (particularly those which do not result in physical injury) and inadequacies in the system for documenting all incidents existed. These problems are being addressed and an ongoing program to review and improve documentation practices will be implemented. However, as a consequence of past inadequacies, the records held are incomplete and appear biased towards:

- periods when reporting dingo incidents was given particular emphasis;
- the more serious incidents requiring first aid (administrative procedures require workplace health and safety investigation and first aid forms to be completed);
- incidents where considerable damage to camping gear occurred; and
- locations where the presence of Rangers is conspicuous and regular.

Successfully reducing the level and frequency of negative interactions between dingoes and people while at the same time maintaining a viable dingo population will require a considerable increase in the present understanding of dingo ecology on Fraser Island. In particular, an assessment of dingo density and distribution across the Island in relation to natural food resources is urgently required to enable the formulation of Island-wide strategies and confirm the impact of localised management programs.



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## Strategy 1

*Comprehensive scientific research and monitoring will be undertaken to ensure the principles and practices of dingo management are sound.*

### Actions

#### **Ecological and historical research**

- Short term research to assess the distribution and density of dingoes throughout the Island in relation to natural food resources will be initiated as a priority.
- A long term dingo population biology/dynamics project will be initiated to gather basic information on demographics and spatial and temporal components of pack numbers and territories.
- A dietary ecology project will be undertaken to investigate seasonal and spatial variation in diet of Island dingoes, the nutritional significance of prey species and the effects of dingoes on prey species.
- Historic and anecdotal information concerning the population size and density of dingoes on Fraser Island during the first half of the 20<sup>th</sup> century will be reviewed as a component of research into dingo population dynamics and ecology. This review would also consider historic information about the numbers, distribution, behaviour and freedom of domestic dogs owned by residents and forestry workers and thus assess opportunities for hybridisation.
- Tissue samples will be taken from deceased or trapped dingoes for DNA analysis.
- Skulls from dingo corpses will continue to be collected and measured to monitor hybridisation.
- The skulls of the 31 animals destroyed after April 2001 will be measured to estimate the current proportion of pure dingoes in the Fraser Island population.

#### **Dingo-human interactions**

- The current wildlife monitoring program will be reviewed and revised to ensure its scientific rigour and to confirm that data collected are relevant to the dingo management program. The revised program will incorporate assessments of both the natural and human-derived food resources available for dingoes.
- Monitoring of dingo abundance and behaviour at sites across the Island, including both remote sites and high-use visitor centres, will be part of QPWS work programs. The monitoring effort will be influenced at times by levels of dingo activity and incidents in different management units but will be designed to ensure sampling is not biased so that changes can be measured and interpreted.
- A program of regular monitoring will include recording and photographing individual animals, numbers of animals at all visitor nodes and the frequency and duration of dingo visits to these sites, an accurate and representative range of dingo incidents, and the size and status of the dingo population for collating in a central QPWS database.
- Island visitors will be surveyed about dingo incidents and responses correlated with incident reports by Rangers.
- The possible correlation between the dingo breeding season and greater levels of aggression towards humans will be investigated more thoroughly. If confirmed, additional precautions such as closures of certain areas or increased publicity and Ranger patrols may need to be considered at these times.
- Collated and analysed information will be used to predict temporary dingo 'hot spots' as a basis to set incident reduction targets, improve the accuracy of future risk assessments and better direct or modify management and education programs.

- Workplace health and safety reporting will be continued, with requirements possibly simplified and streamlined to enable better reporting.

#### **Training**

- QPWS staff involved in dingo management will be trained in dingo identification (including recognition of basic features such as sex, age/size, scars and other distinguishing marks), incident reporting and related matters. Resort staff and Island residents will be trained as necessary.

#### **Methodology**

- Marking techniques (such as tagging or using pellet guns to apply non-toxic, waterproof dyes) for animals considered habituated will be investigated and tested.
- Methods for the cost-efficient and effective processing of scat samples will be investigated.

#### **Funding and co-operation**

- Funding options for core research projects such as population biology/dynamics and dietary ecology will be investigated.
- Research proposals and funding arrangements will be negotiated with interested universities and research organisations.

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## 4 Public education

Distributing educational material has been the prime management strategy to discourage inappropriate visitor behaviour. Material has been available since the early 1990s with significant additional resources being developed around 1998. These include a series of brochures, posters, displays and signs. Interpretive activities have been conducted during peak visitor periods. Guides on commercial tours also provide various types of information to their clients. A late afternoon program of face-to-face talks by Rangers with backpackers at Indian Head in late 1998 halted dingo incidents there. This labour-intensive approach demonstrated that such contact is one of the most productive ways of changing visitor behaviour.

Similarly volunteer campground hosts have been trialed with success. Accordingly, implementation of a campground host program would provide an effective means of ensuring that visitors understand relevant laws and guidelines and thus are more likely to comply with them. This program would also address a number of QPWS obligations in respect of duty of care and enable a timely response to dingo issues. Although certain high-use sites such as Lake Boomanjin, Indian Head and ultimately a proposed new campground at Central Station may benefit from permanent placements, most locations would warrant only a seasonal hosting program in line with peak visitation periods. Clearly the campground host program will not completely remove all risks associated with dingoes and consequently there will remain a need for barrier fences, lockers and other strategies at high risk and remote sites (see below).

What is apparent from surveys (Howard et al. in press), interviews (O'Brien 1995; Stillwell 1995) and Rangers' conversations with visitors is that many visitors (less than 50 percent) still arrive on Fraser Island without knowing the appropriate behaviour towards dingoes. However, Howard et al. (in press) found that approximately two-thirds (68 percent) of respondents gained some information about dingoes at some stage during their trip, the major sources being the *Be dingo smart* brochure, on-site dingo interpretive display boards and information on toilet doors. They consider this relatively high rate of success in communicating the desired message indicates that distributing educational material is a prime management strategy for discouraging inappropriate visitor behaviour towards dingoes.

Prior to the results of the survey by Howard et al. (in press) becoming available, additional measures had been put in place by QPWS to further improve public awareness. The *Be dingo smart* brochure provided with camping and entry permits is issued to most people visiting Fraser Island. Day-tour groups are usually advised of the appropriate behaviour by their driver-guides and all tour companies are provided with brochures. These steps ensured that all visitors to the island, not just those who are issued permits, have the opportunity to become fully dingo-aware. Even for the majority who do have a reasonable understanding of the issues involved in dingo-human interactions, unfortunately this knowledge is not always being translated into the correct behaviour when visitors establish camp or interact directly with dingoes.

The people who appear to be deliberately and regularly feeding dingoes and encouraging dingoes to habituate are some Island residents or resort staff, even though they should be well aware of the adverse consequences of this behaviour. On a number of occasions over the last 10 years, dingoes have attacked people, some seriously, in the grounds or environs of resorts or townships.

Improved communication of the educational message would be achieved by the establishment and staffing of an information booth at Inskip Point to complement the existing booth at River Heads, the Island's other major entry point. The new booth could convey all important dingo safety information to intending visitors, as well as providing an outlet for the issue of permits and compliance monitoring. Contractual arrangements should also be established to enable a similar service to be provided by the private permit issue centre at Urangan to Island visitors using the Moon Point barge.

On Fraser Island the education campaign has and should continue to include informing visitors that:

- dingoes are not domestic dogs but are wolves (a subspecies of the grey wolf) which are inherently aggressive and dangerous;
- it is natural for some dingoes to be lean and they therefore do not need to be fed;
- dingoes easily and regularly destroy valuable camping equipment and clothing;
- 'playing' with dingoes can encourage them to bite people;
- actively discouraging dingoes from approaching humans is as important as not encouraging them, if not more so; and
- problem dingoes will be humanely destroyed and inappropriate behaviour by visitors and residents (such as feeding dingoes) is the ultimate cause of their deaths.

Visitors have been informed that dingoes can get into most containers such as eskies and food boxes if they are left accessible but greater emphasis needs to be given to this message.

To improve the effectiveness of the campaign, information should be updated to include:

- dingoes, like other members of the dog family (grey wolves, coyotes), are capable of killing people; and
- even the smallest indiscretions concerning appropriate behaviour towards dingoes can have a cumulative effect and allow the problems associated with habituation to continue.

New or upgraded educational material on Fraser Island dingoes comprises signs, display posters, video, children's book and a revised *Be dingo smart* brochure. More emphasis will be placed on delivery of information via a mass audience format (TV community service announcements, news and radio), and by mandatory introduction by bus tour guides, vessel and barge operators and aircraft pilots or by presentation at visitor nodes including resorts and picnic and campgrounds.

### Strategy 2

*Awareness programs will continue to encourage appropriate behaviour towards dingoes by Island visitors, residents and staff.*

### Actions

#### **Strategic planning and evaluation**

- An evaluation of the programs' effectiveness and recommendations for improvement will be prepared as a matter of priority.
- The suitability of all warning signs about dingoes will be re-evaluated and where appropriate upgraded.
- Research institutions will continue to be encouraged to investigate psychological aspects of human attitudes to the Island dingoes so public education programs can be even more effective.

- Recent social sciences research and Internet discussions on human behaviour will be investigated for possible application to dingo awareness programs.

#### **Information dissemination**

- Education, information and awareness activities will be continued to inform visitors about responsible interaction with dingoes, in particular that feeding dingoes is illegal and people doing so will be fined.
- All visitors to the island, including those on day-tours, will be provided with the *Be dingo smart* brochure.
- An information and permit issue booth will be established at Inskip Point.
- Contractual arrangements will be established with the private permit issue centre at Urangan to ensure dingo safety information is provided to visitors using the Moon Point barge.
- Meetings and newsletters will inform Island residents and resort staff about dingo–human interactions.
- Detailed training and information will be provided for staff of tour operator companies, backpacker hostels, 4WD hire companies and the Island's accommodation businesses to ensure all are conversant with the dingo management strategy, are operating appropriately and are presenting an accurate, uniform education message.
- Mandatory introductory advice will be given to all visitors to the island by vessel and barge skippers, tour bus drivers, taxi operators and aircraft pilots.

#### **Content of educational messages**

- The community will be informed of their responsibilities and consequences of their actions, particularly about habituated dingoes attacking people, stealing food, clothing and equipment, and damaging property.
- The effectiveness of the education program will be enhanced by including additional messages about the risks that dingoes pose and the need for appropriate actions by visitors.
- Visitors, residents and staff will be urged to regard dingoes as wild animals seen infrequently, rather than semi-domesticated camp dogs.
- Techniques and media will be investigated to ensure the education message becomes even more effective.

#### **Personal contact**

- The public contact program will be boosted in part by the creation of additional Ranger positions (one at each base on the Island).
- Rangers on patrol will devote more time and effort to interpretation of information, guidelines and relevant rules and will discourage inappropriate behaviour towards dingoes while using the opportunity to explain the consequences of that behaviour to the public.
- The implementation of a campground host program will be investigated at selected locations.
- A seasonal program of personal contact with campers will be instituted at sites where dingo incidents have occurred frequently. Dingo smart camping competitions will be continued and assessed for improvements.
- Rangers will leave notes on tents recommending ways of dingo-proofing camps.
- The effectiveness of dingo reminders at tents at selected campgrounds will be tested and monitored.

#### **Public awareness and surveys**

- A system to monitor visitor awareness of the dangers of dingoes and the precautions that should be taken in a situation of confrontation with one or more dingoes will be implemented.
- A visitor-friendly dingo incident reporting form will be widely distributed to further raise awareness, facilitate more reliable recognition of dingoes and encourage reporting of all incidents, even minor ones.

- Fraser Island residents and resort staff will be surveyed about their knowledge of and attitudes to dingoes including feeding, attacks, management, regulation and penalties.

### **5 Managing dingo–human interaction**

Human interaction with dingoes can be modified through the design and siting of facilities and additional management activities. These include:

- managing waste in the national park, townships and resorts;
- improving regulation and intensifying law enforcement efforts;
- location and layout of picnic and camping grounds;
- provision of barrier fencing to separate dingoes and humans at high risk sites;
- design, location and provision of facilities; and
- controlling or limiting visitor numbers in particular locations at specific times.

Previous waste management activities, while not directed exclusively at dingo management, have resulted in reducing the volume of garbage available to dingoes. In October 1993 most open garbage dumps were closed (they have all now closed) and the trucking of most refuse to the mainland was instituted. These open dumps previously provided a ready and abundant supply of food and supported high dingo densities. Their closure resulted in a considerable localised decline in the dingo population (Price 1994).

Township residents are required to deliver their rubbish to waste transfer stations or industrial rubbish bins emptied by QPWS garbage trucks. The Maryborough and Hervey Bay Councils reimburse the cost. Kingfisher Bay Resort and Village collects and transfers its own garbage to the mainland for disposal. Anecdotal evidence suggests that dingoes feed from garbage bins in townships and resorts and are a continuing problem at Orchid Beach township and to a lesser extent at Kingfisher Bay Resort and Village.

Currently the legislation does not permit QPWS intervention into dingo-related problems of township and resort garbage. However, successful dingo management on the Island will require an integrated and comprehensive approach including managing all dingoes which reside permanently or temporarily outside of the national park. The ready availability of garbage in those locations is at least partially responsible for the habituation of dingoes which can create a problem in the national park. Conversely, successful management of problem dingoes in the national park could have flow-on effects for visitors, staff and residents in townships and resorts.

Existing legislation provides for people to be prosecuted or served with an infringement notice for deliberately feeding dingoes anywhere on Fraser Island, including within townships and resorts. Although Rangers can issue on-the-spot \$50 fines for such offences, neither they nor Island visitors consider this penalty a sufficient deterrent. A maximum penalty of \$1500 can be imposed by a magistrate, however, this avenue has seldom been pursued. Amendments to the *Nature Conservation Regulation 1994* and *Recreation Area Management By-Laws 1991* are proposed to significantly increase the prescribed penalties for feeding dingoes to \$225 for on-the-spot fines and a maximum of \$3000 for offences dealt with by complaint and summons through court action. The amendments will also require clarification of the definitions of 'dangerous animal' and 'feed'. The latter must incorporate failing to secure food (including the provision of material from fish cleaning) as an offence.

Additional legislative changes would enable individuals found deliberately feeding dingoes to be directed to immediately leave the recreation area and commercial operators caught directly feeding dingoes to have their commercial tour operator permits cancelled.

Most existing picnic areas and camping grounds do not include facilities and infrastructure to reduce the number of dingo incidents. Dingo-proof lockers were trialed at Lake Benaroon hikers' camp and at Central Station campground and found to be successful, indicating that their installation at other sites would be worthwhile. Elimination of risk to human safety could also effectively be achieved by placing barriers between dingoes and people, their food and equipment at key locations including campgrounds, picnic areas, township areas and QPWS bases. A number of other improvements to existing facilities were identified in the risk assessment (EPA 2001) as ways of removing sources of attraction for dingoes. These include the upgrading or construction of toilet facilities, provision of lighting at toilets and rubbish bins, installation of barbecue covers or lids, and construction of wash-up facilities.

Fish cleaning activities encourage dingoes to venture in and around campsites and visitor nodes because of the easy and abundant food supply that discarded fish carcasses represent. Restrictions on fish cleaning activities are required at high-use visitor centres where the presence of dingoes is undesirable and management by other means does not sufficiently reduce the risk posed by these animals. At some locations the provision of appropriately designed fish cleaning facilities will achieve the desired aim.

The prohibition of food is a direct means of eliminating the stimulus for interaction between dingoes and people at certain locations. This approach could be applied effectively to reduce the risk to human safety at day-use areas where the act of eating is not integral to use of the site. At such areas food would be required to be stored inside a vehicle or in a dingo-proof storage container. Removal of established picnic facilities at some sites will be required to encourage a continual flow of people, i.e. to achieve high visitor turnover and short duration visits. Compensatory development of new day-use picnic facilities elsewhere will be required to meet visitor demands in the protected area.

The draft *Fraser Island Camping Management Plan* recommends the permanent closure of some campgrounds and the construction of others to offset these closures. These steps enable the rationalisation of beach camping. The risk assessment (EPA 2001) endorses such recommendations because of their additional justification of reducing visitor risk in line with desirable dingo management measures. Extra restrictions on camping at established dingo concentration areas such as barge landing sites and water points will further assist this aim.

Prior to the fatal attack in April 2001, the option of restricting tourist activities in particular locations and at times relative to critical periods in dingo biology or behaviour had not been utilised as a means of reducing the frequency of dingo incidents. This option should now be given serious consideration when a problem animal is proving difficult to remove from a high-use area or if future research confirms that levels of dingo aggression towards humans peak during the breeding season or that dingo habituation levels are correlated meaningfully with visitor densities. As identified in the risk assessment (EPA 2001), methods of limiting visitor numbers could include:

- establishing daily limits on the number of visitors to the Island;

- setting limits on visitor numbers at specific locations;
- limiting camping to constructed camping areas;
- reviewing the planning controls applying to the freehold/township areas to manage the potential for higher density development; and
- limiting vehicle access permits.

### **Strategy 3**

*The dingo-human interaction will be managed by increasing Island-wide facilities and services that discourage dingoes from interacting with people and obtaining human food, and by prohibiting dingo feeding.*

### **Actions**

#### **Co-operation with other agencies**

- Negotiations will be initiated with the Maryborough and Hervey Bay City Councils to establish co-operative management and enforcement arrangements across all tenures.
- Local governments will be encouraged to fund the provision of dingo-proof garbage bins for all ratepayers.

#### **Co-operation with businesses**

- Protocols and procedures will be developed with resort management for implementing dingo management activities at resorts.
- Resort management will be asked to consider disciplinary procedures for staff found feeding dingoes.

#### **Legislation and enforcement**

- QPWS will pursue changes to legislation to increase existing fines for deliberate feeding of dingoes and enhance enforcement capability.
- Greater effort will be directed towards dingo-related law enforcement and regulatory activities, to be achieved in part through the creation of an additional four Ranger positions (one at each base on the Island).
- Rangers will continue to issue on-the-spot fines or take prosecution action towards any person found deliberately feeding (including passive feeding) dingoes anywhere on Fraser Island, including within townships and resorts.
- The level of visitor non-compliance with regulations and best-practice guidelines in situations of confrontation with dingoes will be monitored and recorded.

#### **Facilities and structures**

- Dingo barrier fences are being or will be constructed at selected high risk picnic or camping grounds, and their installation at other locations investigated. Appropriate fence design, gates and construction materials will need to be determined and field tested.
- An audit of picnic areas and camping grounds will be conducted to determine which sites require improvements to toilet, wash-up and barbecue facilities, and provision of rubbish bin lighting.
- Food and gear lockers will be provided at selected campgrounds, particularly those used by backpackers and hikers.
- The potential for dingo-proof camper crate hire for the secure storage of food will be investigated.
- Four-wheel-drive hire companies and backpacker hostels which provide or hire camping gear will be encouraged to provide dingo-proof food crates.
- A wire rope-pulley apparatus to lift rucksacks out of reach of dingoes will be tested at bush camps with a history of loss or damage to equipment.

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### **Restriction of food availability**

- The application of restrictions on fish cleaning at selected high-use sites will be trialed and specially designed fish cleaning facilities provided at some locations.
- The consumption or display of food at selected day use areas, e.g. high-use lake-side beaches, will be prohibited.
- In conjunction with the above action, existing picnic facilities at certain high risk sites will be removed and new facilities constructed at other, low risk visitor nodes. Monitoring programs will be modified to account for such alterations to detect any changes in dingo activity associated with the relocation of facilities.

### **Camping changes and restrictions**

- The permanent closure of certain campgrounds and the construction of new campgrounds will be undertaken according to the recommendations of the draft camping plan.
- Additional restrictions on camping at particular areas known to attract dingoes, e.g. barge landing sites and water points, will be instigated.

### **Limitation of visitor numbers**

- The possibility of limiting visitor numbers to the Island or at specific locations on the Island (including the imposition of time restrictions) will be investigated in consultation with residents, tour operators, the Fraser Island Community Advisory Committee, native title claimants and the Island's World Heritage Area Management Committee.

## **6 Managing dingo behaviour**

To reduce the number of habituated animals and reverse the habituation process, dingoes should be discouraged from frequenting picnic areas and campgrounds. Conditioning techniques to modify or reverse the dingoes' behaviour can be applied to reinstitute the dingoes' natural wariness towards people and/or educate dingoes to avoid particular locations. One way of achieving this result is through 'hazing', i.e. harassing dingoes by way of irritation. Alternative hazing or aversive conditioning methods to those outlined below might become available in the future.

To reinstitute the dingoes' former wariness of people requires the active discouragement of dingoes by staff and where appropriate by Island visitors and residents. Rangers could use a variety of techniques including non-lethal projectile weapons (e.g. 'ratshot' via a .22 calibre rifle, various crowd control projectiles fired from 12 gauge shotguns, paintball/Skirmish guns or slingshots), spray bottles containing offensive or irritating contents, 'Shu-roo' ultrasonic devices, stock whips and aversive baits. Effective hazing requires the employment of a wide range of different methods. Dingoes quickly become accustomed to a single stimulus and either ignore it or avoid it, only to return to a certain location when the stimulus is not present.

Of the diverse techniques proposed, aversive conditioning using baits containing lithium chloride (or an alternative) offers particular promise, with a potential for large scale application in the environs of high-use areas or specifically with food containers and tents. To prevent impacts on other wildlife any baiting program would need to comply with Department of Natural Resources and Mines standards regarding the size and placement of baits and the impregnation of baits with the aversive substance. Once consumed, the bait induces vomiting and, by association, the unpleasant experience discourages the dingo from eating similar foods in that area. Any aversive baiting program will require careful design, as well as precise implementation and monitoring before, during and after its application. Specific actions would include a localised public awareness program, detailed monitoring of dingo-visitor incidents, scat analysis and monitoring of other locations to ensure problem dingoes have not relocated. Animal welfare organisations would be invited to monitor the impacts of the program in the initial stages and at mutually agreed intervals thereafter.

### **Strategy 4**

*Programs will be implemented to modify dingo behaviour and habits which threaten human safety and wellbeing.*

### **Actions**

#### **Hazing**

- At every opportunity, Rangers will scare dingoes by using simple and appropriate techniques such as non-lethal projectile weapons, spray bottles containing offensive or irritating contents, 'Shu-roo' ultrasonic devices and stock whips to discourage the animals from entering camping, picnic and other high-use areas.
- Island visitors, residents and resort staff will be informed of such actions and encouraged to participate safely in discouraging dingoes from high-use areas and from approaching any human too closely, but only under circumstances where it is safe to do so.
- Rangers will evaluate the effectiveness of alternative methods and devices such as non-lethal projectile weapons, stock whips and spray bottles containing offensive substances to deter dingoes from high-use areas.

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- Trials will be conducted at the Kingfisher Bay Resort and Village and other locations to evaluate the effectiveness of ultrasonic devices as deterrents.

#### **Aversive baiting**

- Trials will be conducted to evaluate the effectiveness of aversive baits, particularly at high-use sites such as Waddy Point campground and Central Station. Baits would be provided in a manner that limits their accessibility to other native fauna.
- If the trials are successful, such baiting conditioning programs will be established in all high-use areas where habituated dingoes are known to occur, particularly the Indian Head camping area.

## **7 Managing dingo populations**

Corbett (1998a) emphasised that it would be irresponsible and counterproductive to establish dingo feeding stations as part of the management program. Provision of abundant, readily accessible food would lead to a higher survival rate of juveniles and, with dispersal from natal territories, eventual saturation of the Island by dingoes. Subsequently most young animals would starve, be killed by resident packs or be forced to rely on high visitor-use areas, thereby escalating levels of dingo-human interaction. The end result would be an increase in both dingo mortality and numbers of attacks on humans.

Alternative options for managing dingo populations hinge on destruction of problem animals and a limited and selective cull. Strategies involving the relocation of animals to other sites on the Island or to wildlife parks on the mainland have been considered but are not currently supported. Reasons for this decision are discussed below.

### **7.1 Dangerous animals**

Dingoes which have proved to be dangerous have been destroyed to prevent future incidents involving that animal from occurring. Animals considered 'dangerous' include those involved in unprovoked attacks or pack attacks as well as individuals displaying definite aggression in the form of biting, nipping or lunging at humans. Dingoes have also been destroyed as a management option to reduce the level of risk to humans in identified high risk areas, i.e. in situations where animals have become or are becoming habituated and where the potential for interaction with people is considered unacceptable and other control measures are not practical or have failed. This was the basis for the destruction of 28 dingoes following the fatal attack on the Island in April 2001. An additional three animals were subsequently destroyed after they were involved in aggressive interactions with humans.

Authority to destroy a dingo on Fraser Island is only provided by a small number of delegated officers. The procedure has been undertaken by a nominated officer acting in a humane manner safe for the officer and the public. The identified animal has been trapped, removed and destroyed or, when safe to do so, shot when free ranging. The RSPCA will be invited to contribute to the further development of procedures and protocols for the safe and humane euthanasia of dingoes. Other dingoes which move into the area formerly occupied by the destroyed animal must then be prevented from developing the same unacceptable behaviours. This will be achieved by employing a range of non-lethal control methods as described previously.

The identity of any animal proposed to be destroyed will be confirmed by referring to documented records of its behaviour and any known marking the animal possesses. This process will be facilitated by routine use of a digital camera to maintain a photographic record of problem animals at high-use visitor nodes.

As much information as possible will be collected from any individual that has to be destroyed. In addition to taking DNA tissue samples and skulls from dead animals, information about age, physical characteristics and diet will be recorded. This type of information would assist and augment components of the proposed ecological research program (Corbett 1998a, p13).

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## Strategy 5

*Any dingo identified as dangerous will be destroyed humanely using accepted methods after receiving appropriate approvals.*

### Actions

#### **Adopting a risk classification system**

- Existing guidelines for assessing the risk posed by dangerous and problem dingoes based on an individual's level of aggression and habituation will be reviewed and modified to ensure a uniform response to such animals is adopted.
- Justification for the destruction of any dangerous dingo by trained QPWS staff will be based on a confirmed identification and an assessment of the individual's documented history of behaviour against established risk criteria.

#### **Methodology**

- A protocol for the safe and humane destruction of a dingo will be developed with input from the RSPCA and veterinarians.

#### **Training**

- Staff will be trained and equipped to humanely trap, handle and euthanase dingoes and to undertake autopsies and data collection.

#### **Monitoring**

- Accurate records will be maintained of the number of dingoes that are destroyed each year and this information fed back to the population dynamics research project to ensure that over the long term dingo numbers do not decline as a result of direct management action.

## 7.2 Culling

The mass culling of dingoes on Fraser Island would conflict with QPWS obligations regarding management of a national park and a World Heritage Area and is not warranted at this stage. The suggestion to cull a limited number of dingoes was made by Corbett (1998a, p12) who indicated such a program should be based on 'the assimilation and application of information from short term and long term management options'. Culling would only be considered if research could substantiate existing anecdotal evidence indicating that the majority of serious dingo attacks occur when self-regulation of the dingo population is most prevalent. In this event the management option to 'speed up this natural process and cull appropriate animals so that the frequency and severity of attacks on humans would be reduced' (Corbett 1998a, p14) may be implemented. Only under rare circumstances would dominant males and females be considered.

Although such a program has significant conservation, socio-political and ethical ramifications, other important objectives to be achieved from selectively culling dingoes would include:

- balancing dingo numbers with the seasonal availability of natural foods (creating a sustainable population, i.e., one that is ecologically and genetically viable and in dynamic equilibrium with natural food sources); and
- improving the overall genetic purity of the Island's dingo population.

This could be achieved by removing individuals exhibiting hybrid coat colours or, in future, those animals identified as hybrids by DNA testing.

## Strategy 6

A cull to a sustainable level may be undertaken if research can show the population is not in balance with the seasonal availability of natural foods.

### Actions

#### **Culling**

- Providing scientific evidence supports it, a small cull of dingoes may be undertaken by applying the same practices as identified under Strategy 5.

#### **Monitoring**

- Accurate records will be maintained of the number of dingoes that are removed from the population through a culling program each year and this information fed back to the population dynamics research project to ensure that over the long term dingo numbers do not decline as a result of direct management action.

Any long term culling program would need to be based on extensive research into the biology and genetics of the dingoes. Components of that program would include:

- researching dingo population dynamics (variations in the size, distribution and density of the population over time) (Corbett 1998a, pp7,15);
- researching the dietary ecology of dingoes, placed in the context of Fraser Island's natural environment (Corbett 1998a, p15);
- monitoring the availability and supply of natural and human-derived foods (Corbett 1998a, p15); and
- assessing the genetic make-up of the dingo population (level of hybridisation and genetic diversity) via skull measurements and any valid DNA analysis techniques.

## 7.3 Relocation

In the past, relocation of dangerous or aggressive dingoes elsewhere on the Island has proved ineffective. Competition for and defence of territory has meant that the relocated animal was killed or re-established itself elsewhere and continued to pose a threat. On several occasions an animal has returned to the area where it was causing a problem. Relocating problem dingoes to the wild on the mainland is not an option as it is an offence to keep or move a dingo unless the person operates under the auspices of and for the purposes of a registered zoo or wildlife park.

Three sub-adult dingoes were relocated to a mainland zoo in 1994. Two of the animals survived for several years but remained difficult to handle when compared with other, captive-bred dingoes. Eventually in 1999 they were put down due to safety issues and concerns for the animals' quality of life. The individuals were considered to have been too old at the time of relocation for this approach to have succeeded. Interest in taking wild dingo pups from Fraser Island has been expressed by several dingo breeding and conservation organisations and individuals. However, Corbett (1998a) warns that relocation to captive dingo centres on the mainland should not be considered until valid genetic assessment techniques (e.g. DNA fingerprinting) are available to ascertain the purity of live dingoes. While current research has established good molecular techniques, no suitable pre-European reference material has yet been analysed so that all preliminary DNA identifications made to date have been equivocal. At present, the only reliable method to assess dingo purity is measurement of skulls of dead adults.

For these reasons, and because zoos and wildlife parks have the option to source captive bred dingoes from other institutions with breeding populations, the strategy of relocating dingoes or dingo pups from the Island is not supported.

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## **8 Program monitoring and review**

The initial risk assessment conducted following the fatal attack on 30 April 2001 (EPA 2001) identified estimated risk ratings for each of the Island's visitor nodes and ranked these on a site-by-site basis. It also determined the main causal factors contributing to the likelihood of negative dingo/human interactions. Due to the potential for one or more of the risk factors to change, particularly in light of concerted management action in the interim period, it is necessary to monitor these factors and review the impact that any changes have on the risk ratings at each site. This risk monitoring and reassessment program will need to be conducted on both a regular and reactive basis, using the procedures established during the initial risk analysis, at all sites on the Island.

Risk factors to be monitored are:

- visitor numbers and age composition;
- visitor behaviour towards dingoes (e.g. neutral, inciting);
- dingo numbers, and frequency and duration of dingo visits;
- food availability (e.g. quantity, form and accessibility); and
- incidents.

Comprehensive risk assessments have not been conducted within townships and other private landholdings on the Island, although the ready supply of food and numbers of people exposed at these sites indicates the existence of a potential threat from dingoes. Additional risk analyses for these locations is required to enable dingo management measures to encompass the full range of land tenures on Fraser Island.

The aim of the ongoing monitoring and review program is to ensure that a reduction in risk occurs as a result of the implemented management strategies. The periodic review process will allow the effectiveness of various actions to be evaluated, thereby enabling the prioritisation or modification of actions to be made as required. Similarly, results of investigations will be incorporated as appropriate to alter the direction or emphasis of the overall management program. This approach will guarantee that dingo management on the Island remains a dynamic, evolving process.

## **Strategy 7**

*An ongoing program of monitoring and review will be conducted to assess risk levels at key visitor nodes across the Island and determine the effectiveness of dingo management strategies in maintaining these levels at an acceptable (low) level.*

### **Actions**

#### **Monitoring and review of risk levels**

- Continual monitoring of risk factors including changes in visitor pressure and the availability of human-derived food will be conducted at all sites.
- Risk levels at all locations will be reassessed quarterly for the first year of this strategy's implementation and then six monthly thereafter using previously established methodology.
- Additional risk assessments will be conducted for all non-protected land tenures on the Island, wherever possible utilising cost sharing arrangements.

#### **Monitoring and review of management actions**

- Management actions will be reviewed periodically to assess the success of the program and to incorporate the results of research and newly available technologies.

#### **Reporting**

- Reporting on implementation of dingo management strategies will occur quarterly for the first year of this strategy's implementation and then six monthly thereafter.
- A major review of the management program which incorporates risk analysis documentation will be conducted within six months of the implementation of this strategy. This will be subjected to scrutiny by an independent auditor.



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## 9 Implementation

Local governments, tour operators and other private sector interests will be invited to support the strategies and actions to manage dingoes on Fraser Island outlined in this report through provision of services, participation in training and visitor education programs, liaison with QPWS staff or other relevant contributions.

Regular consultation with representatives of private industry, conservation groups, registered native title claimants, scientific interests and other Government agencies will be integral to reviewing progress in the strategy's implementation.

Actions detailed in this strategy involving the direct management of dingoes (destruction of individuals or prescribed culling) would only be implemented if supported by the results of research and/or in situations where risks to human life or safety are unacceptably high and cannot be diminished through alternative measures. Such direct management actions are likely to occur irregularly. The other major components of the overall strategy, namely reducing opportunities for dingo-human interaction and the management of human behaviour through public education, will require continuing implementation. If these strategies work, direct management of dingoes should rarely be required after the program's initial phase.

Improved staffing for dingo management will result from four new Rangers being appointed, with one being based in each of the Island's management units (Waddy Point, Dundubara, Eurong and Central Station) and reporting directly to the Ranger-in-Charge in that unit. A Senior Conservation Officer in Maryborough will also be appointed to co-ordinate the dingo management responsibilities of these new Rangers.

Following these appointments, each management unit should have at least one Ranger whose duties are principally focused on dingo management. Ideally, shifts will be structured to ensure that the two Rangers at the southern end of the Island (Eurong and Central Station) and at the northern end (Waddy Point and Dundubara) are on opposite shifts. Responsibilities of the dingo management Rangers would include:

- public contact to inform Island visitors of appropriate behaviour concerning dingoes;
- enforcement of dingo-related regulations;
- monitoring and recording the status of dingo packs in their management unit (photographic records);
- marking and tagging pups and problem animals;
- involvement in aversive conditioning projects;
- co-ordinating other staff in their management unit to ensure that dingo incident forms are completed and collated for data entry at the end of each shift;
- maintaining dingo-related equipment (traps, fences, dingo incident sheets);
- induction and training of new staff in the dingo management program including staff responsibilities;
- when authorised, the trapping and destruction of problem dingoes; and
- within the management unit, liaising with and assisting research staff and co-ordinating minor projects (collection of skulls, DNA tissue samples, scats).

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## Appendix A

### Assessment of risks to humans on Fraser Island from dingoes comparing May 2001 and October 2001

Key: E – Extreme, H – High, M – Moderate, L – Low

EURONG MANAGEMENT UNIT		
Location	Risk level May 2001	Risk level October 2001
Hook Point barge landing	L	L
Dilli Village	M	L
Lake Boomanjin camp ground and day-use area	L	L
Eurong township	H	M to be further assessed
Eurong beachfront (camp area)	M	L
Eurong QPWS base	L	L
Zone 1 beach camping area	L	L
Zone 2 beach camping area	L	L
Zone 3 beach camping area	M	L
Lake Wabby beach carpark	L	L
Lake Wabby inland carpark and lookout	L	L
Stonetool Sandblow Lookout	L	L
The Oaks private residence	L	L
Poyungan Rocks private residences	L	L
Rainbow Gorge car park	L	L
Yidney rocks private residences	L	L
Happy Valley township	M	L
Eli Creek and boardwalk	L	L
Lake Garawongerra day-use area and beach	L	L
Eurong Resort	unknown	to be further assessed

<b>CENTRAL MANAGEMENT UNIT</b>		
<b>Location</b>	<b>Risk level May 2001</b>	<b>Risk level October 2001</b>
Gary's Anchorage	M	M further assessment required
Ungowa campground	M	L
Ungowa QPWS base	M	L
Wanggoolba Creek barge landing	L	L
Lake Birrabeen southern tourist operator area	L	L
Lake Birrabeen upper car park, toilets and day-use area	L	L
Lake Birrabeen beach	M	L
Lake Birrabeen lower tourist operator bus park area	L	L
Central Station proper	M	L
Central Station QPWS duplex residence	L	L
Central Station new camp ground	L	L
Lake Benaroon hikers camp	L	L
McKenzies Jetty	L	L
Lake McKenzie public car park	M	L
Lake McKenzie campground	H	M
Lake McKenzie tourist operator bus park and BBQ site	M	L
Lake McKenzie hikers camp	M	L
Lake McKenzie main beach	M	L
Pile Valley car park	L	L
Kingfisher Bay Resort and Village	E	Significantly reduced risk based on site specific assessment

<b>DUNDUBARA MANAGEMENT UNIT</b>		
<b>Location</b>	<b>Risk level May 2001</b>	<b>Risk level October 2001</b>
The Maheno shipwreck	L	L
The Pinnacles	L	L
Zone 4 beach camping area	M	L
Cathedral Beach Resort	L	L
Dundubara campground	L	L
Dundubara QPWS residences	L	L
Indian Head (headland)	H	M
Indian Head campground	H	M
Knifeblade Sandblow carpark and lookout	L	L
Lake Allom day-use area	L	L
Moon Point barge landing	L	L
Puthoo QPWS camp	L	L
Zone 7 beach camping area	L	L
Coomboo Lake QPWS camp	L	L
Lake Bowarrady hikers camp	L	L

<b>WADDY POINT MANAGEMENT UNIT</b>		
<b>Location</b>	<b>Risk level May 2001</b>	<b>Risk level October 2001</b>
Middle Rocks car park	H	M
Waddy Point campground	E	H
Waddy Point day use area	H	M
Waddy Point QPWS residences	L	L
Waddy Point beach front campground	M	M
Waddy Lodge	L	L
Orchid Beach township	L	L
Orchid Beach Fishers Reserve camp ground	L	L
Wathumba Creek camp ground	L	L
Zone 5 beach camping area	L	L
Ocean Lake day-use area	L	L
Zone 6 beach camping area	L	L
Sandy Cape fisherman's camp	L+	L
Sandy Cape QPWS residence	L	L
Waddy Point (headland)	L+	L

#### **Notes**

- Risk controls have significantly reduced the risks in most locations. These controls include those outlined in the risk assessment study undertaken in May, and the draft dingo management strategy.
- The assessment and audit of the risks and the implementation of the management strategy and risk controls are on-going. However, the risk levels assigned are considered a reasonably accurate estimate at the time made of the risks posed to humans by dingoes.
- A number of controls are still to be implemented and it should be considered that the underlying risks still exist in many locations and only through continued maintenance of systems, procedures and resource inputs will the potential risks be managed, controlled and, where able to be, further reduced.

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## 11 Glossary

**Aversive baits:** Meat baits laced with an appropriate chemical (lithium chloride or thiabendazole etc.) to induce illness (vomiting) in the dingo that eats the bait. The dingo's illness should then discourage further consumption of similar foods in that locality for a limited time.

**Aversive conditioning:** A process whereby a negative stimulus encourages an animal to discontinue a particular behaviour.

**Canis lupus dingo:** Scientific name for the dingo (after Corbett 1998b). This name recognises the dingo's ancestry, i.e. it is a subspecies of the grey wolf (*Canis lupus lupus*).

**Culling:** To kill animals according to selective criteria, that is the proactive or predetermined killing of animals with a view to controlling numbers or preventing a situation/event arising. In this case, controlling numbers means reducing dingo numbers to a level where the population is self-sustaining, i.e. balanced with the natural food supply.

**Destroy:** This is the existing response to a particular dingo that exhibits continuing aggression or causes a significant injury. To destroy an animal is a reactive response.

**Dingo incident:** Refers to an interaction between a dingo(es) and a person or their property and includes harassment, a nip, a bite, food theft, gear theft, gear damage, tent damage, and grabbed clothing.

**Habituation:** A behavioural adaptation by a wild animal whereby a 'stimulus (a human presence) initially regarded as threatening may, if repeated without negative reinforcement, eventually become ignored' (Bolen and Robertson 1995, p112).

**Hazing:** Any of the non-lethal methods used to deter dingoes from frequenting an area and to re-instil in them a fear of humans, i.e. avoidance behaviour.

**High-use area:** Locations or destinations which because of some natural feature, available activity or facility attract and concentrate relatively large numbers of people. This includes picnic areas, camping grounds, car parks and recreation points such as Lake McKenzie Beach.

**Management unit:** Fraser Island is split longitudinally and laterally to make up four management units. In most instances each unit operates independently day-to-day.

**Scat:** Animal faeces. Examination and identification of bones, teeth and hair in the scat can be used to determine an animal's diet.

**Wild:** The terms 'wild' and 'in the wild' refer to dingoes 'in an independent state of natural liberty' (*Nature Conservation Act 1992*, p15).

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