

# Fraser Island dingo management strategy - review



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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 Queensland Parks and Wildlife Service (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 crossbred 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). The dingo was recently placed on the World Conservation Union's Red List (IUCN, 2004) as a species vulnerable to extinction due to the threat of hybridisation with domestic dogs. Therefore, their conservation is of national significance. Corbett noted that 'All dingo populations in Australia contain hybrids of which there are two types, one is dingo-like, and the other is non dingo-like. The Fraser Island population is fortunate in being all dingo-like. Currently it is not practical to manage for genetically pure dingoes, but it is possible to manage for dingo-like hybrids'.

The number of visitors to Fraser Island has increased over the last 15 -20 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 potential for inappropriate interaction between dingoes and people is of concern to the QPWS.

An independent audit of the dingo management program was conducted by Dr Laurie Corbett in October 2003. Additionally an independent evaluation of the dingo education strategy and program was conducted by Dr Elizabeth Beckmann in 2003. This was followed by a review of all management actions by QPWS. The review was aimed at updating management actions to make best use of the newly available information. All action statements have been reviewed and modifications made to adapt to changing circumstances and information derived from scientific and management programs initiated since 2001.

The overall objectives of the 2001 dingo management strategy remain current and includes:

- ensure the conservation of a sustainable wild dingo population on Fraser Island;
- reduce the risk posed to humans by dingoes on Fraser Island 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 that 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 humanely destroying individuals) should not need to continue indefinitely and are only undertaken when risk assessments necessitate the need. The components of the overall strategy that will require ongoing implementation are those involving public education and measures to limit dingo-human interaction.

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.

## **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.

### ***2.1 Background information***

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 (Woodall et al 1996). 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, strategies directed primarily at educating visitors about appropriate behaviour when dealing with dingoes have been implemented. 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. The 2001 management strategy was 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 the 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.

Following the event 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 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. The dingo management strategy and ongoing risk assessments act in concert with one another to provide for the long-term management of dingoes on the Island. Risk assessments have been conducted quarterly since May 2001 and demonstrate an overall reduction in risk across the island.

A comparison of the risk levels conducted quarterly from May 2001 to December 2005 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.

## **2.2 Current Situation**

In November 2001 the Queensland Government released The Fraser Island Dingo Management Strategy (FIDMS). This report presented strategies for managing dingoes on Fraser Island. The strategy was based primarily on Queensland Parks and Wildlife (QPWS) files and reports, a report from consultant Dr. Laurie Corbett and information from QPWS staff. It also incorporates recommendations of a risk assessment report prepared in May 2001.

An independent audit of the dingo management program was conducted by Dr Laurie Corbett in October 2003. An independent evaluation of the dingo education strategy and program was conducted by Dr Elizabeth Beckmann and Environmetrics, completed in March 2003. Short and long term research programs have commenced and future research needs identified. Negotiations for future projects in conjunction with various research organisations and dingo experts are ongoing. The review was aimed at assessing all management actions and updating these actions to make best use of newly available information. All action statements have been reviewed and modifications made to adapt to changing circumstances and information derived from scientific and management programs initiated since 2001. Major findings from the 2003 audit by Dr Corbett include:

- The two major aims of the ongoing, Fraser Island dingo monitoring and review program are to ensure the conservation of a sustainable wild dingo population and to ensure a reduction in the risk to humans from dingoes, both as a result of implemented management strategies.

- Of the 82 strategy actions, 18 were completed, 34 were progressing appropriately and 30 were progressing but modifications have been implemented or are recommended.
- There has been a significant reduction in the number of dingoes observed at visitor nodes and a consequent decrease in the number of dingo/human interactions.
- Of many contributing actions including signage and hazing, the two most significant actions are the fencing of visitor areas including camping grounds and day use areas and the Campground Ranger program.
- Although many dingoes have been humanely destroyed since 2001 the preliminary results from current scientific studies suggest that dingoes remain prevalent and widely distributed across the island.
- Current studies are insufficiently advanced to provide significant input to the long- term impact of culling on Island dingo populations and whether natural food supplies can maintain a minimal viable dingo population.
- Until research indicates otherwise, QPWS must continue to base destruction decisions on the risk assessment system.
- The most immediate and pressing problems are related to beach camping, disposal of fish offal and the lack of compliance and co-operation from some businesses and residents.
- Overall most of the implemented actions have been effective in achieving a reduction in risk to humans from dingoes.
- Regarding the second major aim of conserving dingoes, appropriate research programs are progressing, but insufficient data are currently available to assess whether current management of the total Island dingo population is sustainable in the long-term.

### **2.3 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 the *Land Protection (Pest and Stock Route Management) Act 2002*. Currently QPWS is conducting workshops to manage dingoes on protected areas throughout Queensland, refining established policies and procedures and aligning practices with other Agencies.

Most of Fraser Island is part of Great Sandy National Park and also the Fraser Island Recreation Area. Fraser Island is 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. There are also small areas of unallocated State land under the management of the department of Natural Resources and Mines.

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 \$3000. Under the *Recreation Areas Management By-laws 1991*, a person who feeds an animal 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 \$225.00 on-the-spot fines for offences. Under the *Nature Conservation Regulation 1994* and *Recreation Areas Management By-laws 1991* a person in a Recreation Area or Protected Area must not feed or disturb dingoes and must keep food safe from dingoes. Staff can issue \$225.00 on the spot fines for offences with a maximum penalty of \$3000.

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 Great Sandy Region Management Plan recognises that measures can and will be reasonably taken in various circumstances to prevent harm occurring to visitors (Queensland Government 1994, p132). Agency risk management policy and procedures provide the basis for implementing strategies that 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). RSPCA inspectors have continued to approve and monitor management actions and strategies on a regular basis as well as monitoring the condition of the dingo population in general.

This dingo management strategy will not be implemented in isolation, but rather with 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.

## **2.4 Natural environment and the dingo population**

Due to its relative isolation from the mainland and uniform 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, possibly two species of bandicoot, and echidnas.

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).

Data collected from management and scientific programs confirms the dingo population on Fraser Island to average about 16 kilograms and 1.2 metres long. This is a higher average mass than dingoes from the Victorian Highlands (15 kilograms) and Central Australia (13 kilograms) and the same as those in Kakadu (Corbett, L. 1995, "*The Dingo in Australia and Asia*", UNSW Press, Sydney). The dingoes from these three areas were also about 1.2 metres long, indicating that Fraser Island's dingoes are about the same size as dingoes from other areas and, if anything, a bit heavier. They certainly are not leaner than dingoes from other areas.

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 derived 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. 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).

Current studies are providing preliminary data that suggests human derived food comprises 10% or less of the dingo diet, a significant reduction from previous studies. Current studies also indicate that significant dietary items continue to include fish, bandicoots, echidnas, plant material, insect material and various species of rodents. Preliminary results from this study should be available in 2005, and will assist in assessment of the effectiveness of strategies currently in place and provide future management directions. 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 territory and pack sizes showing little variation. Recent monitoring work however has shown that some animals are travelling long distances through territories occupied by resident packs and surviving in some instances. Recent observational data also shows some packs sizes and territories are variable and hostile 'takeovers' do occur. Current studies will provide more accurate base line data on the total population size and pack

dynamics. The initial collaborative PhD study ‘population and behavioural ecology of the dingo on Fraser Island’ should be completed in 2006.

## **2. 5 Dingo–human interactions**

### **2.5.1 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 15 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 aggressive dingo 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, 312,000 in 1999/2000 (DEH and EDAW 1998, QRAMB 1999-2000), to over 395, 000 in 2004. Perhaps more significantly, dingoes had access to a reliable year round source of food generated by the steady number of campers to the Island and their general lack of care in securing food items.

Increased visitor numbers have seen a corresponding rise in interactions between dingoes and visitors. Whilst 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. Whilst the general trend has been an increase in the number of negative interactions over many years, recent intensive management programs have resulted in a higher level of visitor awareness with more incidents being recorded due to the higher levels of staff resources devoted to the program. This intensive management program has resulted in a subsequent decrease in the severity and number of more serious (aggressive/dangerous) negative interactions in recent years.

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, in some cases 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.

Intensive management programs initiated since 2001 have focused on two major aims of conserving a sustainable wild dingo population and ensuring a reduction in risk to humans from dingoes. An independent audit in 2003 determined that overall most of the implemented actions have been effective in achieving a reduction in the risk to humans from dingoes and thus one of the major aims of the ongoing monitoring and review program is being met. 'It is clear there has been a significant reduction in the number of dingoes frequenting visitor nodes and a consequent decrease in the number and severity of negative interactions'. 'This is basically because dingoes are being denied access to easily obtained human food and thus are obliged to forage elsewhere on natural prey' (Corbett 2003). 'Regarding the second major aim of conserving dingoes, appropriate research programs are progressing, but insufficient data are currently available to assess whether or not current management of the total Island dingo population is sustainable in the long term' (Corbett 2003). Although many dingoes have been humanely destroyed since the 2001 tragedy, the preliminary results of current scientific studies suggest that dingoes remain prevalent and widely distributed across the island (Corbett 2003).

Of many contributing actions including signage and hazing the two most significant actions are fencing of campgrounds and day use areas, and the campground Ranger education and enforcement program. Fencing physically excludes dingoes from people and food and Ranger educational advice to people at unfenced sites converts to minimal human food availability and appropriate responses to dingoes (Corbett 2003). The most immediate and pressing operational problems are related to beach camping, disposal of fish offal and the lack of compliance and co-operation from some businesses and residents. Evidence shows some dingoes are still regularly obtaining a large percentage of their diet from human derived food sources, such as fish offal from the beach, and within residential and resort areas.

Anecdotal evidence suggests some residents and resort staff continue to feed dingoes. QPWS staff do not have legislative powers to infringe people on freehold/leasehold areas for issues such as unsecured rubbish and leaving food available for wildlife. QPWS staff resources are unable to cope with enforcement issues within township and resort areas. Recent dingo dietary research shows a large proportion of fish offal still present in scats, probably indicating another important human-derived food source that needs to be reduced to ensure dingoes are consuming more natural foods. The result of this ongoing access to human derived foods is the continuing habituation of dingoes leading to aggressive/destructive behaviour by dingoes across all land tenures. Continuation of the Campground Ranger education and enforcement program is critical to addressing the operational problems associated with beach camping and fish offal disposal.

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 (rubbish 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 have generally stimulated 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.

In 2001 a higher priority was placed on dingo education and the education/enforcement program was intensified. Ten permanent Campground Ranger positions were created to specifically focus on delivering dingo education programs and boost enforcement capability for non-compliance of dingo related legislation.

A further study commissioned by QPWS in 2003 (Beckmann, Savage 2003) showed the broad messages of the education strategy have been communicated successfully to the important audience groups. Most visitors, residents and tourism service providers know that dingoes are a danger on the Island, that they should not be fed, that food and rubbish should be stored safely, that people should not interact with dingoes, that children should be accompanied and what to do if threatened by a dingo. All stakeholders report notable behavioural changes in 2001 and 2002 with respect to feeding dingoes, interacting with them, storing food and rubbish and the supervision of children. All audience groups appear to have moved a long way toward complying with new requirements (Beckman, Savage 2003).

A revised incident reporting system was introduced in 2002. The current format and breadth of information gathered is appropriate (Corbett 2003). Currently most information is recorded by Rangers and research students with participation by some residents and resort staff. The system to involve reporting by a wider group including

Island residents, staff and visitors will be progressively expanded as awareness levels amongst stakeholder groups is raised and training programs are implemented. Rangers record dingo sightings, dingo behaviour and dingo-human interactions (incidents) on standard pro-forma sheets. Under the Campground Ranger program QPWS staff attempt to visit all camps to provide advice and ensure compliance with dingo management programs. During these visits information is also gathered on dingo sightings and behaviour and any dingo/human interaction is recorded on incident reporting sheets for input into a central data-base. The validity of the data recorded is reliant on the ability of Rangers to apply accurate and consistent criteria when identifying dingoes and assessing behavioural categories.

To ensure the validity of information it is important to regularly assess the pro-forma recording sheets and train and assess staff to ensure consistent interpretation of dingo descriptions and behavioural categories. Although labour intensive this action has proved successful in reducing risk posed by dingoes and interrupting the dingo habituation process due to prohibiting animals gaining access to human derived foods. The current education and incident recording program has been identified by experts including Dr Corbett and Dr Beckmann as one of the major reasons for the obvious and significant reduction in negative dingo/human interaction that Fraser Island now experiences. The continuation of the permanent Campground Ranger program is critical to achieving the strategy objectives.

### **2.5.2 Types of incidents**

Several hundred incident reports have been lodged since 1990 and a major review of the incident reporting system was conducted in 2002 and implemented in July 2002. This system continues to be reviewed and will be further refined by a proposed centrally located and more widely accessible database. These reports and monitoring 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 that 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.

A major review of the type of incidents and recording of incident details was conducted in 2001 with a revised system introduced in 2002. This incident reporting system defines incident type and the threat to life and property and assigns categories to dingo behavioural codes relative to attributes displayed by individual animals. The system records information to assist in identifying individual animals. The system also records the type, behaviour, knowledge and response of people involved in dingo interactions. The incident reporting system provides direction for appropriate management response to individual animals or incidents. The incident reporting system is designed to provide Rangers and Managers with directions and guidelines that enable them to interpret animal behaviour and categories, human behaviour and responses and to ensure reporting and management response is consistent and reliable. The incident reporting system is a major component for assessment of risk levels, which are conducted on a quarterly basis.

### **2.5.3 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. Evidence indicates that deliberate feeding is not widely practised but does occur in township and resort areas. Inadvertent feeding occurs when dingoes obtain rubbish from dumpsters, bins, slovenly or careless campers, bait, fish offal and frames carelessly disposed of on the beaches and 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) that can result in human injury or, in the worst case, death. A person responding in a way that will further excite or encourage aggressive animals can exacerbate the seriousness of the outcome. This includes behaviour such as running near dingoes, throwing objects at it, splashing water or waving arms around, walking alone and leaving children unattended.

## **2.6 Strategies and objectives**

The information above has guided the development of strategies to manage dingoes on Fraser Island. These centre on what are referred to as the three E's of dingo management – Education, Engineering and Enforcement but also and importantly include:

- 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 on Fraser Island 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.

## **2.7 Principles underpinning the strategy**

Formulation of the dingo management strategy was based on the following key principles.

- 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 practical/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 have 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.

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. Some research programs to address these knowledge gaps are currently in progress including population and behavioural ecology and prey analysis studies and further research programs are being negotiated with research institutions and relevant experts.

Research and monitoring requirements were reassessed following the death of the young boy in 2001, resulting in many programs being upgraded and new programs initiated. Current programs are progressing well and include QPWS staff programs and collaborative research projects involving various research institutions. QPWS programs include:

- Tagging and monitoring of individual animals.
- Monitoring of dingo abundance and behaviour
- Dingo profile records
- Incident monitoring, data collection and analysis
- Quarterly risk assessments
- Scat collection for dietary studies
- DNA sampling to assess for hybridisation, relatedness and total population size
- Dingo autopsies
- Skull measurements to ascertain hybridisation levels.
- Dingo activity monitoring

Collaborative programs include:

- One year Honours, Ultra Sonic deterrent trial, completed (Griffith University, QPWS)
- One year Honours, Analysis of QPWS dingo data base, completed (Griffith University, QPWS)
- Three year PhD, Population and behavioural ecology of the Dingo on Fraser Island, due for completion 2006 (Uni Queensland, NRM, QPWS)

In 2003/4 Corbett in conjunction with other experts and staff identified priority needs for the next stage of research. Projects to address the priority areas are currently being negotiated and/ or investigated include:

- Two year Masters, Dietary ecology study, commenced February 2004 (Uni Sunshine Coast, QPWS)
- Three year PhD, Radio tracking study, currently investigating collaborative project (Griffith Uni, QPWS)
- Three year PhD, Interactions between dingoes and humans on Fraser Island, project commenced in 2005 (Griffith Uni, QPWS)

The major short term dingo ecology study (Population and behavioural ecology of the Dingo on Fraser Island) involves a collaborative project with QPWS, NRM and Queensland University. This project has the objectives to:

- Provide data on dingo seasonal and habitat utilisation activity
- Provide data on prey utilisation and activity
- Provide accurate population estimate
- Investigate the effects of culling on dingo populations and interactions
- Provide baseline ecological data for use in a dingo management strategy

Preliminary analysis from this study confirms that highest dingo activity levels coincide with highest levels of visitation namely over the Easter and August/September holiday periods. The highest levels of dingo activity occur along the eastern beach areas which also have the highest levels of visitor use. The study shows a significant difference in dingo and prey activity between habitats and that dingo activity patterns vary seasonally and by habitat. The study also shows the dingoes having a wide variety of natural prey items and many are still accessing human derived food sources. This study is due for completion in 2006.

The three year PhD, Population and behavioural ecology of the Dingo on Fraser Island, is structured so that QPWS Dingo Rangers will continue some of the data collection and monitoring. This data collection and monitoring will include, passive activity monitoring, scat collection and analysis, dingo autopsies, prey species analysis, DNA sampling and skull measurements for assessments of hybridisation, population size and relatedness.

The audit report by Corbett in 2003 identified current research as appropriately focused and preliminary results appear to be of a high standard, however it is important to

understand that current studies are insufficiently advanced to provide significant input to the long term impact of culling on the Island dingo population and whether natural foods can maintain a minimum viable dingo population. Preliminary results of current scientific studies suggest that dingoes remain prevalent and widely distributed across the island (Corbett 2003). Gaps in current knowledge identified by various experts including Corbett are currently being addressed with recently commenced and proposed projects including radio tracking studies, dingo/human behavioural studies, prey analysis studies and continued monitoring.

In the past 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 have been addressed and an ongoing program to review and improve documentation practices has been implemented. A greater number of visitors are now reporting dingo incidents and sightings and a more prominent ranger presence provides more consistent and reliable information. 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.

A new incident reporting system has been implemented. This system was incorporated into an island wide database and further refined in July 2003. Data collected since July 2002 is considered consistent, accurate and of high quality. QPWS staff now have a much greater understanding and knowledge of the risk level and number of dingo/human interactions to assist in making management decisions. As a priority it is proposed that this data base be centralised and accessible through a standard Agency intranet site. Ease of access will facilitate an increased range of activities reported and allow more accurate and consistent monitoring and reporting of dingo and visitor behaviour. This more readily available information will assist in management programs such as lowering risk in visitor sites and predicting “hot spots” or identifying and monitoring problem animals.

### **Strategy 1**

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

### **Actions**

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

1.1 Short term research to assess the distribution and density of dingoes throughout the island in relation to natural food resources will be continued as a priority.

1.2 Data analysis of current dingo research programs will be conducted as a priority, to validate current methods, to recommend future projects, to ensure there is no gap in data collection and to obtain an accurate estimate of the total Island dingo population.

1.3 A long-term dingo population biology/dynamics project will be continued to gather basic information on demographics and spatial and temporal components of pack numbers and territories.

1.4 A radio tracking study will be investigated in partnership with research institutes as the next phase of the long-term population biology/dynamics project.

1.5 A dietary ecology project will be undertaken to investigate seasonal and spatial variation in diet of Island dingoes, the availability of prey species and the effects of dingoes on prey species.

1.6 An intensive monitoring program (three-monthly for a two year assessment period) sampling all major habitats will be conducted concurrently and in similar locations to the scat collections with the aim of understanding fluctuations of native prey species in the diet of dingoes.

1.7 Tissue samples will be taken from deceased or trapped dingoes for DNA analysis to assist in determining levels of hybridisation animal movements and activity and total population size estimates. Duplicate samples will be held until the validity of DNA analysis methods are confirmed.

1.8 Skulls from dingo corpses will continue to be collected and measured to monitor hybridisation.

1.9. All skulls currently held should be re-measured to confirm data is accurate. Rangers should be continually trained and reassessed to ensure accuracy in taking measurements.

1.10 Dingo carcasses resulting from natural deaths and culling operations will be collected and autopsied to monitor dingo physical condition, cause of death, diet, parasite loads, age etc.

1.11 Results from dietary analysis of gut contents from autopsied animals will be analysed and correlated with scat sampling results.

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

1.12 Research and monitoring of dingo behaviour and dingo-human interactions will be undertaken as a priority. To provide a more comprehensive view of general dingo behaviour, dingo and human behaviour will be monitored prior to during and after interactions with the objective of better understanding spatial, temporal and behavioural patterns of dingoes to enable better management decisions aimed at minimising negative interaction and prevent serious human injury when interactions occur.

1.13 Monitoring of dingo abundance and behaviour at sites across the Island, including both remote sites and high-use visitor centres, will continue to 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. Rangers and students should be regularly assessed to ensure consistent interpretation of dingo descriptions and behaviour.

1.14 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.

1.15 Island visitors will be surveyed about dingo incidents and responses correlated with incident reports by Rangers.

1.16 The possible correlation between the dingo breeding season and greater levels of aggression towards humans will continue to be investigated. If confirmed, additional precautions such as closures of certain areas or increased publicity and Ranger patrols may need to be considered at these times. Preliminary analysis of current data supports this correlation and should be used to provide a quantitative basis for management actions.

1.17 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.

1.18 Workplace health and safety reporting will be continued as a high priority.

### ***Training***

1.19 QPWS staff involved in dingo management will continue to 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 on an ongoing basis.

1.20 Training programs will be regularly evaluated and updated to ensure new information is incorporated and techniques remain valid and consistent.

### ***Methodology***

1.21 Marking techniques (such as tagging or using pellet guns to apply non-toxic, waterproof dyes) for animals will continue to be investigated and tested. The current tri-colour ear tagging system will continue until a better system is identified

1.22 QPWS staff involved in dingo management will be trained in the efficient and effective processing of scat samples. Scat collection and analysis projects will be continued to provide information for dietary ecology projects including seasonal and spatial variation in the diet of Island dingoes and the effects of dingoes on prey species.

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

1.23 Funding options for core research projects such as population biology/dynamics and dietary ecology will be investigated.

1.24 Research proposals and funding arrangements will be negotiated with interested universities and research organisations.

1.25 All research projects must submit key results for publication in a peer-reviewed scientific journal within 12 months of completing University requirements. All such publications and other related external reports and articles must appropriately acknowledge QPWS and relevant staff.

## 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 and 2002/3. 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.

What was apparent from surveys, interviews (O'Brien 1995; Stillwell 1995) and Rangers' conversations with visitors was that less than 50 percent of visitors arrived on Fraser Island without knowing the appropriate behaviour towards dingoes. However, Howard et al. 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 - aware 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. becoming available, additional measures had been put in place by QPWS to further improve public awareness. The 'Be Dingo Aware' brochure, provided with camping and entry permits is issued to most people visiting Fraser Island. Day-tour groups are advised of the appropriate behaviour by their driver-guides, all tour companies are provided with brochures for handing out to all visitors and, resorts, rental properties, businesses and residents are provided with Dingo education and awareness material. These steps ensure 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.

Since 2001 Campground Rangers have successfully been employed to provide an effective means of ensuring that visitors understand relevant laws and guidelines and thus are more likely to comply with them. This labour intensive program is targeted at face to face contact with all campers to ensure educational messages are received and understood and to ensure compliance with legislative provisions by all visitors. The program of face to face contact is also responsible for gathering consistent reliable information on dingo biology and behaviour, human behaviour and compliance and incident recording. This information forms the basis for ongoing risk assessment. This program also addresses a number of QPWS obligations in respect of duty of care and enables a timely response to dingo issues. 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. The presence of ‘Campground Rangers’ has been vital in communicating a strong level of detailed information and supervising compliance with regulations (Beckman 2003). The current “Be dingo Aware” campaign with a basis in theoretical models of behavioural change is considered to be very innovative and ‘best practice’ by international experts (Beckman 2003).

The recent study “Evaluation of Dingo Education strategy and Programs for Fraser Island” (Beckmann, Savage 2003) showed a major increase in levels of knowledge across all stakeholder and visitor groups. All stakeholders reported notable behavioural changes in 2001 and 2002 (when the dingo education program was intensified) with respect to feeding dingoes, interacting with them, storing food and rubbish and the supervision of children. All audience groups appear to have moved a long way towards complying with new requirements. Most visitors, residents and tourism service providers know that dingoes are a danger and what the appropriate behaviour towards dingoes should be (Beckman, Savage 2003).

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 15 years, dingoes have attacked people, some seriously, in the grounds or environs of resorts or townships. Whilst there have been negative interactions risk assessments indicate the likelihood of being attacked has significantly decreased since 2001.

Contractual arrangements with private permit issuing centres should include a mandatory dingo - aware information component to be delivered to clients along with the issuing of permits and compliance monitoring. 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, descended from the Asian wolf), which are inherently aggressive and dangerous;
- dingoes, like some other members of the dog family (grey wolves, coyotes) are capable of killing people;
- it is natural for some dingoes to be lean and therefore they do not need to be fed by humans;
- 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 important to prevent habituation;
- encouraging dingoes (for photos, to loiter etc) can contribute to habituation and is inappropriate behaviour;
- problem dingoes will be humanely destroyed and inappropriate behaviour by visitors and residents (such as feeding dingoes) usually is the ultimate cause of their deaths;

- even the smallest indiscretions of inappropriate behaviour towards dingoes can have a cumulative effect and allow the problems associated with habituation to continue;
- both intermittent and regular feeding of dingoes by humans strengthens inappropriate dingo behaviour so that all feeding (direct or indirect, deliberate or accidental) must stop.

Visitors have been informed that dingoes can get into most containers such as eskies and food boxes if they are left accessible and a greater emphasis has been given to the message of appropriate food storage.

New or upgraded educational material on Fraser Island dingoes comprises signs, display posters, video, children's books and revised '*Be dingo aware*' brochures. More emphasis will be placed on delivery of information via a mass audience format 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.

A product of the Evaluation of Dingo Education Strategy and Programs for Fraser Island was a Communication Plan 'Managing Dingoes on Fraser Island'. This Communication Plan aims to guide the communication strategy related to dingo management on Fraser Island. It has been developed with input from QPWS staff and existing draft communication plan documentation; a recent literature review on research and experiences pertinent to wildlife communication issues; and findings from the evaluation of the current communication approaches and relevant on-site audience research.

Major components of this plan include:

Everyone on Fraser Island must be persuaded to behave appropriately in relation to dingoes. This Plan is designed to outline the necessary communication strategies to ensure that the following desirable behaviours become standard on Fraser Island:

- People stay with their children at all times (the paramount objective).
- People take care to be 'dingo-safe' at all times.
- People see dingo sightings as a special event.
- People help with collecting data about dingoes.
- People become better able to identify individual dingoes.
- People know what to do if they have a negative encounter with a dingo.
- People support the efforts being made to tell them about dingoes.
- People support the efforts being made to manage dingoes for the benefit of both the species and Fraser Island residents/visitors.

This Plan addresses the four 'A's of dingo-related communication i.e. it aims to ensure that all people living, working or visiting Fraser Island have the necessary information to make them:

- aware of the natural behaviour of dingoes, including the likelihood of habituation, attraction and potential aggression towards humans;
- alert to the potential dangers that dingoes may pose, especially towards children;
- attentive to individual dingo characteristics (e.g. tags, scars, colour, behaviour) for identification purposes should they need to describe an errant dingo to a Ranger; and
- active in behaviours that minimise risk (e.g. not feeding wildlife; careful food and rubbish/scraps/bait/burley storage, staying with children at all times, walking in groups, reactive behaviour if threatened or attacked).

There are four key message themes that must be communicated. In order of priority, these are:

- Protecting children—why and how;
- Staying safe—how people should behave to minimise the risk of them or their property being threatened or attacked by dingoes;
- Safeguarding food—making sure dingoes cannot access food supplies, rubbish, scraps, bait and burley; and
- Understanding dingoes—respecting dingoes as a wild animal of national significance.

These four key message themes are summarised under the communication concept of ‘Being Dingo Safe’—safe children, safe adults, safe food, safe species.

The recommended new slogan is ‘Are you Dingo-Safe?’

## **Strategy 2**

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

### **Actions**

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

2.1 Re-evaluation of the programs’ effectiveness and recommendations for improvement will be undertaken on a regular basis as identified in the Fraser Island Dingo Communication Plan.

2.2 The suitability of all warning signs about dingoes will be re-evaluated and where appropriate upgraded. Direction for upgrades is provided as part of the education evaluation study and sign audit.

2.3 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.

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

2.5 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.

2.6 All visitors to the island, including those on day-tours, will continue to be provided with the dingo information brochure.

2.7 Contractual arrangements will be established with all private permit issue centres to ensure dingo safety information is provided to all visitors.

2.8 Meetings and newsletters will continue to inform Island residents and resort staff about dingo–human interactions.

2.9 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.

2.10 Introductory advice regarding dingo safety issues will continue to be given to all visitors to the island by vessel/ barge skippers and tour bus drivers. This will be extended to all other transport service providers including taxis aircraft.

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

2.11 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.

2.12 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.

2.13 Visitors, residents and staff will be urged to regard dingoes as wild animals seen infrequently, rather than semi-domesticated camp dogs.

2.14 Techniques and media will be investigated to ensure the education message becomes even more effective.

#### ***Personal contact***

2.15 The campground rangers will continue to support the public contact program. Efforts will focus on priority areas like beach camping and fishers.

2.16 Rangers on patrol will continue to 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.

2.17 A seasonal program of personal contact with campers will be instituted at sites where dingo incidents have occurred frequently. Dingo safe camping competitions will be continued and assessed for improvements.

2.18 Rangers will leave notes on unoccupied tents recommending ways of dingo-proofing camps.

2.19 The effectiveness of dingo reminders at tents at selected campgrounds will be tested and monitored.

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

2.20 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 continued.

2.21 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.

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

2.23 Options to increase off park extension, education and awareness to residents (townships) and businesses will be reviewed and implemented where applicable in partnership with other stakeholders.

2.24 QPWS will consider a Dingo safety/ awareness week to be held during peak visitor periods.

## 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 rubbish available to dingoes. Since October 1993 all open rubbish dumps have been 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 and businesses are required to deliver their rubbish to waste transfer stations or industrial rubbish bins emptied by QPWS rubbish trucks. Kingfisher Bay Resort and Village collects and transfers its own rubbish to the mainland for disposal. However, evidence indicates that dingoes continue to feed from rubbish bins in townships and resorts so that this food availability to dingoes is a continuing problem.

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 rubbish in those locations is at least partially responsible for the continuing 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. The completion of the QPWS dingo barrier fence around King Fisher Bay Resort and Village has significantly reduced availability of rubbish and other human derived food at this location. Ongoing discussion is occurring with other resort and township areas to address the problems of dingoes obtaining human derived food from residential and resort areas.

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. Rangers can now issue on-the-spot \$ 225.00 fines for such offences, this penalty is considered a sufficient deterrent. A maximum penalty of \$3,000.00 can be imposed by a Magistrate, however, this avenue has seldom been pursued to date. Amendments also allow Rangers to issue on the spot infringements of \$225.00 for failing to keep food safe from native animals and disturbing native animals on the Recreation Area and National Park Estate. Rangers are unable to prosecute offences of leaving food available for native animals or failing to secure food appropriately on Freehold and Leasehold tenure areas. Serious consideration must be

given to addressing the legislative anomalies off the protected area estate and who will be responsible for enforcing dingo related legislation on Freehold and Leasehold land tenures. Consistent legislative provisions and staff to conduct enforcement operations must be available for the strategy to be effective across all land tenures on the Island. The Amendments to the *Nature Conservation Regulation 1994* and *Recreation Area Management By-Laws 1991* are significant increases on the previous prescribed penalties. The amendments also clarify the definitions of ‘dangerous animal’ and ‘feed’ and incorporate failing to secure food (including the provision of material from fish cleaning) as an offence within the Protected Area Estate. Additional legislative changes 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.

A range of facilities and infrastructure are now in place in picnic areas and campgrounds and will continue to be monitored for effectiveness. Most existing picnic areas and camping grounds include facilities and infrastructure to reduce the number of dingo incidents. Dingo-proof food lockers have proven to be successful in many locations. Elimination of risk to human safety is also effectively achieved by placing barriers between dingoes and people, their food and equipment at key locations including campgrounds, picnic areas, township areas and QPWS bases. Dingo exclusion fences have been constructed at Waddy Point, Dundubara, Central Station, Dilli Village and Lake Boomanjin campgrounds, Kingfisher Bay Resort and Village, and a number of hikers camps and day-use areas. 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, all of which have been implemented at different locations on the island. All future infrastructure developments will consider dingo management options as part of the planning process and ensure design details are appropriate for dingo risk mitigation in all locations. The potential to install food lockers at popular beach camping zones will be investigated. Waste management initiatives such as, development of fenced waste transfer stations and the removal of bins off the beaches will be investigated and implemented where practical to deter dingo access to waste food sources.

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 present. Restrictions on fish cleaning activities have been implemented 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. Fish cleaning has also been banned from selected beach sites and designated fish cleaning areas nominated. At some locations the provision of appropriately designed fish cleaning facilities will achieve the desired aim. Correct disposal of fish offal in designated areas is an ongoing issue. Problems persist particularly during peak fishing periods with inappropriate offal disposal the major concern. Problems are most evident during the ‘Tailor season’ from July to October. The extensive length of the eastern beach, innumerable camping and fishing sites and the isolated nature of the Island make it very difficult to implement disposal options other than burial below the high water mark.

Despite the best efforts of QPWS staff to advise visitors of appropriate burial techniques and locations the problem persists. QPWS will continue to investigate appropriate options for fish cleaning areas and more effective offal disposal techniques. Options to limit fish offal availability such as, provision of fish offal mincing stations during tailor season will be investigated.

The prohibition of food is a direct means of eliminating the stimulus for interaction between dingoes and people at certain locations. The areas have been identified but limited action has been taken to date. This approach is applied effectively to reduce the risk to human safety at day-use areas such as car parks where the act of eating is not integral to use of the site and food preparation and consumption encourages dingoes to these high use visitor sites. At such areas food is 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, in line with recommendations from the current site capacity study relating to visitor management. Compensatory development of new day-use picnic facilities elsewhere may be required to meet visitor demands in the protected area.

The Fraser Island Camping Management Plan recommends the permanent closure of some campgrounds and the construction of others to offset these closures. The campgrounds at Lake McKenzie, Indian Head and Central Station have been closed and the new facilities at Central Station opened. These initiatives enable the rationalisation of beach camping, which may result in the temporary closures at high risk sites. This has proven to be a highly effective option for short-term risk management. 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 has further reduced the risk posed to humans by dingoes.

Preliminary analysis of current data shows a correlation between dingo breeding and whelping seasons and recorded incidents, which coincide with high levels of visitation. A trial of temporary camping restrictions was conducted in the One Tree Rocks beach camping area in 2003. This option was implemented after a continuous extended period of negative interaction between people and dingoes. The area was closed to camping for a three month period and subsequent negative interaction declined to almost zero over the closure period. This option has proven successful for reducing short term risk at specific locations and should remain as an effective strategy for addressing short term risk. Some problems were experienced with this trial closure including public perceptions that there were other reasons for the closure, slow response for approvals to implement the restrictions and displacement of affected user groups and animals. Procedures and protocols for restricting tourist activities at individual sites during critical risk periods require development to ensure restrictions can be implemented quickly and the general public and stakeholder groups informed.

### **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***

3.1 Negotiations will be continued with the Maryborough and Hervey Bay City Councils to establish co-operative management and enforcement arrangements across all tenures.

3.2 Local governments will be encouraged to fund the provision of dingo-proof garbage bins for all ratepayers.

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

3.3 Protocols and procedures will continue to be developed with resort management for implementing dingo management activities and appropriate infrastructure design including rubbish disposal, availability of food and possible fencing within resort areas.

3.4 Resort management will be encouraged to continue disciplinary procedures for staff found feeding dingoes or leaving food available or failing to secure food.

##### ***Legislation and enforcement***

3.5 QPWS will pursue changes to address legislative anomalies on land tenures not covered by the protected area estate (eg keeping food safe from animals, disturbing animals) and enhance enforcement capability. Possible changes to local government by laws and authorised officers will be investigated to ensure consistency across all tenures.

3.6 Greater effort will be directed towards dingo-related law enforcement and regulatory activities.

3.7 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.

3.8 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***

3.9 Dingo barrier fences are being or will be constructed at selected high-risk picnic or camping grounds, and their installation at other locations will be investigated for all development proposals. Appropriate fence design, gates and construction materials will continue to be field tested to ensure they are effective.

3.10 All picnic areas and camping grounds will be regularly audited to determine which sites require improvements to toilet, wash-up and barbecue facilities and provision of rubbish bin lighting.

3.11 All new developments for day use and camping areas will ensure appropriate facilities are in place to address dingo management issues.

3.12 Food and gear lockers will be provided at selected campgrounds and where practical at popular beach camping zones, particularly those used by backpackers and hikers.

3.13 Four-wheel-drive hire companies and backpacker hostels which provide or hire camping gear will be encouraged to provide dingo-proof food crates.

***Restriction of food availability***

3.14 The application of restrictions on fish cleaning at selected high-use sites will be continued.

3.15 The provision of specially designed fish cleaning facilities at some locations will be investigated for feasibility.

3.16 The feasibility of providing fish offal mincing stations during Tailor season will be investigated.

3.17 The consumption or display of food at selected day use areas, e.g. high-use lake-side beaches, will be prohibited.

3.18 Waste management initiatives such as, development of fenced waste transfer stations and the removal of bins off the beaches will be investigated and implemented where practical.

***Camping changes and restrictions***

3.19 The permanent or temporary closure of certain campgrounds will continue to be undertaken according to the recommendations of the Camping Management Plan and as risk assessments determine.

3.20 Additional restrictions on camping at particular areas known to attract dingoes, e.g. barge landing sites and water points, will be continued.

***Limitation of visitor numbers***

3.21 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 Traditional Owners, residents, tour operators, the Fraser Island Community Advisory Committee and Scientific Advisory Committee 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, campgrounds, residential areas and all high use visitation sites. 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. providing a negative stimulus that can be associated with a particular behaviour. 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 and collars. 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. While QPWS staff should be the primary source of hazing, investigating the training and use of resort staff and residents in hazing activities has been instigated. Rangers have trialed numerous aversive conditioning devices including most of those mentioned above. Current hazing is predominately undertaken using sling-shots with a clay ball or marble projectile and ratshot fired from a .22 calibre rifle. To date techniques such as crowd control projectiles, offensive sprays and ultra sonic equipment have been trialed with little success. All techniques have been trialed and implemented in conjunction with RSPCA Inspectors. QPWS will continue to investigate new techniques for undertaking hazing activities.

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. Initial trials could be conducted using captive animals in a controlled situation. Specific actions 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 are invited to monitor the impacts of the program in the initial stages and at mutually agreed intervals thereafter.

## **Strategy 4**

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

### **Actions**

#### ***Hazing***

4.1 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.

4.2 Island visitors, residents and resort staff will be 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.

4.3 The feasibility to identify and train certain residents and resort staff to safely use slingshot hazing techniques and participate in hazing programs will be investigated subjected to legal advice and safety concerns.

4.4 Rangers will continue to 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. Options are required to enable rotation of practices for hazing to remain effective.

4.5 New advances in ultra sonic deterrent or alternative technology will be monitored for possible application in dingo management programs.

#### ***Aversive Baiting***

4.6 Evaluation of the effectiveness of aversive baits will be undertaken with possible trials conducted. If possible initial trials should be conducted using captive animals in a controlled situation.

4.7 If the trials are successful, such baiting conditioning programs will be established in high-use areas where habituated dingoes are known to occur. Baits would be provided in a manner that limits their accessibility to other native fauna.

## **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 population's 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 that 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. Guidelines for assessing the risk posed by dangerous animals have been reviewed and updated to provide Rangers with systematic, consistent and effective protocols for identifying individual animals and their behavioural characteristics to determine the level of risk posed to humans and determine an appropriate management response for individual animals. 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. Dingoes identified as 'dangerous' will continue to be destroyed using acceptable methods.

Authority to destroy a dingo on Fraser Island is only provided by a small number of delegated officers. The procedure is undertaken by a nominated officer acting in a humane manner safe for the officer and the public. The identified animal is trapped or immobilised by darting, removed and destroyed or, when safe to do so, shot when free ranging. The RSPCA continues 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).

### **Strategy 5**

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

#### **Actions**

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

5.1 Existing guidelines for assessing the risk posed by dangerous and problem dingoes based on an individual's level of aggression and habituation have been reviewed and modified to ensure a uniform response to such animals. Guidelines and training will be continually reviewed to ensure a consistent response.

5.2 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***

5.3 A protocol for the safe and humane destruction of a dingo has been developed with input from the RSPCA and veterinarians. Only trained, accredited staff will undertake destruction activities.

##### ***Training***

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

##### ***Monitoring***

5.5 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 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 and when self-regulation fails and there are many dingoes not in a normal pack structure. 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.

Corbett noted in his audit in 2003 that, current research is appropriately focussed and preliminary results appear to be of a high standard. However regarding feedback from scientific studies to aid in management decisions, it is important to understand that current studies are insufficiently advanced to provide significant input to the long term impact of culling on Island dingo populations and whether natural food supplies can maintain a minimum viable dingo population. Until relevant studies are completed, QPWS essentially must base culling decisions on the risk assessment system (Corbett 2003).

## **Strategy 6**

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

### **Actions**

#### ***Culling***

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

#### ***Monitoring***

6.2 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 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, particularly 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 succeed. 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 tests) 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. 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 at present.

## 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 is 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 been conducted within townships and other private landholdings on the Island to encompass the full range of land tenures on Fraser Island. The ready supply of food and numbers of people exposed at these sites indicates the existence of a potential threat from dingoes.

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***

7.1 Continual monitoring of risk factors including changes in visitor pressure and the availability of human-derived food will be conducted at all sites.

7.2 Risk levels at all locations will be reassessed quarterly and more often for individual sites where changing circumstances dictate. Previously established methodology will be used to conduct the assessments.

7.3 Risk calculator variables should be regularly reviewed to confirm their validity.

7.4 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***

7.5 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***

7.6 Reporting on implementation of dingo management strategies will occur three monthly.

7.7 A major review of the management program, which incorporates risk analysis documentation, will be conducted every three years. An independent auditor will subject this to scrutiny.

## 9 Implementation

Local governments, tour operators and other private sector interests have been 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 are 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) are 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 has resulted in four new Rangers being appointed, with two being based in each of the Island's management units (Fraser Island South and Fraser Island North Management Units) and reporting directly to the Natural Resource Management Ranger. A Senior Conservation Officer was appointed to co-ordinate the dingo management responsibilities of these Rangers. Ten Rangers (Campground Rangers) were also employed to ensure the public contact and monitoring components of the strategy are maintained. Each management unit has at least one Ranger whose duties are principally focused on dingo management. Shifts have been structured to ensure that dingo management capable Rangers are on opposite shifts to ensure Ranger availability. Responsibilities of the dingo management Rangers includes:

- 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 ( eg collection and measurement of skulls, DNA tissue sample collection, scat collection and analysis, autopsies, stomach content analysis, sand plot monitoring and prey monitoring).

## 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, 2004). This name recognises the dingo's ancestry, i.e. it is a subspecies of the grey wolf (*Canis lupus lupus*) descended from the Asian wolf *Canis lupus pallipes*.

**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.

**Disturb:** Means approach, lure, pursue, tease or attempt to disturb.

**Feed:** To feed a dingo includes using food to tease or lure an animal and attempting to feed the animal.

**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, scales, feathers and hair etc. 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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