



ecosure

Final Report

Fraser Island Dingo Management Strategy
Review

December 2012

Department of Environment and Heritage Protection

Executive summary

Background

Fraser Island is the world's largest sand island, located off the coast of Queensland, Australia. It was listed as a World Heritage Area in 1992 for its outstanding natural universal values, since which time Queensland Parks and Wildlife Service (QPWS) has managed the national park and natural assets within it.

The Island (known to Traditional Owners as K'gari or paradise) has many unique natural values with a wide variety of native flora and fauna. The dingo is a key part of this unique ecosystem, as well as being an iconic species that contributes to the Island being an international tourist destination attracting approximately 400,000 visitors a year.

A wide range of stakeholders share keen interest in the management of Fraser Island, including; the Butchulla people as custodians of the Island, the Queensland government responsible for management, the Fraser Island World Heritage Area Committees appointed to oversee management as a World Heritage Area, various conservation and special interest groups, residents of the Island and members of the tourism industry.

The Fraser Island Dingo Management Strategy (FIDMS) commenced in 1998 with a QPWS risk assessment, and was expedited in 2001 following a fatal incident. Since this time, management of dingoes on Fraser Island has continued to be a highly publicised and contentious issue, with some public opposition and many divergent views.

The broad objectives of the current FIDMS are to ensure a sustainable wild dingo population on Fraser Island, manage risk posed to humans and provide visitors with a safe opportunity to view dingoes in their natural environment.

FIDMS review

Continual improvement is facilitated by regular review. A full review of the FIDMS was last completed in 2006, along with various audits and a review of educational material, which led to the current strategy.

While QPWS (within the Department of National Parks, Recreation, Sport and Racing) is responsible for the implementation of the current FIDMS; the Department of Environment and Heritage Protection (EHP) was appointed to independently commission and oversee this independent scientific review. A review steering committee was also established to oversee the review process, and provide recommendations to the Minister for EHP.

The scope of this review was to:

- evaluate and report on the effectiveness of the strategy in relation to its objectives
- conduct an audit of the 91 actions under the current strategy
- investigate alternative proposals and options
- recommend actions for a revised strategy.

Methods

The methods used during this review included:

- review of literature and QPWS protocols, procedures and databases
- site assessment
- quantitative and qualitative data analysis
- consultation through a stakeholder workshop, online survey, regular meetings, QPWS staff interviews, general correspondence and review of public submissions.

Results and recommendations

The review found the objectives and strategies within the current FIDMS to be largely appropriate. There is also an opportunity to improve the outcomes through the addition of two objectives; one to specifically ensure dingo welfare, and another to build community understanding and acceptance (including a strategy to form a stakeholder group to allow regular two-way communication). As there is no evidence to suggest that the population cannot naturally self-regulate, the strategy for a broad cull to a sustainable level should also be removed.

Dingo incidents and humane destruction

One of the most contentious issues is the destruction of dingoes displaying behaviour considered to be dangerous to people. Analysis of humane destruction protocols and data showed that:

- decision-making, methods of euthanasia and staff training are appropriate
- contrary to some community perception, there are no records of any dingoes being destroyed solely for loitering since the cull in 2001
- the current level of destructions would be highly unlikely to impact the breeding component of the dingo population. However, accurate population data and effective methods of ongoing monitoring are urgently required to confirm this.

Another common criticism is of a dingo 'playing' with people being recorded as an incident. While play behaviour can be considered lower risk than aggressive behaviour, it must be recognised that a potentially dangerous animal 'playing' with people is not appropriate.

It is important that QPWS staff have a thorough understanding of dingo behaviour to ensure consistency in reporting, and in order to best manage dingoes involved.

Non-lethal management

Fencing is considered to be the most effective of all engineering solutions as it physically separates humans from dingoes. Minor incidents recorded within the fence were associated with occasional breaches, which are thought to occur almost entirely through people intentionally compromising the fence (i.e. propping gates open). Further investigation into preventing this is critical to ensure the fences retain their effectiveness.

Hazing, a non-lethal approach designed to deter dangerous wildlife, of dingoes on Fraser Island has been mainly through the use of sling-shots. Variable results of hazing meant that it has seldom

been undertaken since 2010. This practice should be officially abandoned unless scientific trials can demonstrate its efficacy and assess potential welfare and behavioural impacts.

Although presently used in a limited capacity, temporary campground closures appear to be a much underutilised non-lethal approach and should be explored with greater effort.

Other non-lethal methods should continue to be investigated and trialled where appropriate to identify alternative approaches to direct management techniques.

Trapping and tagging

The capacity to identify a habituated dingo is critical to allow staff to best manage the animal and people in its territory, thus reducing the likelihood of negative human-dingo interaction.

The ongoing trapping program is conducted under approval from an animal ethics committee; however assessment highlighted potential improvements to trapping procedures.

Body condition should continue to be considered prior to tagging, and tagging should be limited to individuals weighing more than 10 kilograms. Tagging should also continue to be restricted to individuals exhibiting or anticipated to exhibit problematic behaviour.

Education and enforcement

Review of the education strategy and enforcement data, together with consultation undertaken for the review, identified that:

- the current education strategy is reasonably comprehensive and for the most part appears to be effective, although information is limited to the effects of education on knowledge and attitudes rather than on behaviour
- improvements could be made to the appropriateness of some current education measures, including with regard to consistency to further expand delivery of educational material
- it is considered critical that high quality information continues to be produced and disseminated
- public preference appears to be for delivery of information online, during transit or face-to-face, which highlights the importance of ranger briefings
- while a suitable balance between education and enforcement is required to ensure community support and compliance, enforcement should be increased and include intensive compliance programs. There was strong public support for increased enforcement, including the concept of visitor contracts between QPWS and visitors.

Action audit

An audit of the 91 actions in the current strategy showed that five are complete, 40 are ongoing and progressing appropriately, 28 are ongoing and require progression, 12 are not yet achieved and six are recommended for exclusion. Recommendations were consolidated wherever possible, and only those recommended for complete removal were categorised as recommended for exclusion. Actions in future FIDMS should be measurable and prioritised to

ensure clear direction and effective implementation.

Data collection and dissemination

Data dissemination and improved transparency are keys to building community understanding and acceptance of the strategy.

A strategic research plan should be developed to ensure the large amount of data collected by QPWS and various research projects is effectively used to improve and inform the FIDMS. This would also facilitate more consistent and comparable data collection, a lack of which was a critical constraint to the evaluation process.

Data limitations are understandable given resource constraints and the responsive nature of the roles of many QPWS staff, however need to be addressed to improve the overall success of the FIDMS. This can be achieved partly through streamlining processes and engaging volunteers where appropriate. A small visitation fee would provide an important resource to assist in effectively managing the Island and contributing to dingo conservation, and would also provide a simple solution to current constraints associated with lack of accurate visitor data. It is recognised there is a range of potential issues associated with introducing such a fee that require further investigation.

Conclusion

Management of Fraser Island dingoes is a complex issue involving numerous and diverse stakeholders. It requires a multi-faceted approach, with a strong focus on education, animal welfare and managing people and an ongoing commitment to conservation. Streamlining and improving current practices through a strategic approach, allocating additional resource and improving stakeholder consultation will all greatly assist to improve the FIDMS.

Acknowledgements

Ecosure would firstly like to thank the Review Steering Committee for volunteering their guidance and support throughout the review: Professor Hugh Possingham (University of Queensland), Professor Clive Phillips (University of Queensland), Ms Sue Sargent (Burnett Mary Regional Group) and Professor Chris Johnson (University of Tasmania).

We recognise the considerable time contributions from staff at the Department of Environment and Heritage Protection and the Department of National Parks, Recreation, Sport and Racing (particularly Queensland Parks and Wildlife Service, Great Sandy region). We also greatly appreciate the openness and enthusiasm they showed for the review.

We are extremely grateful to members of the stakeholder workshop expert panel who added great value to the workshop on a volunteer basis: Dr Lee Allen (Biosecurity Qld); Mr Ross Belcher (QPWS), Dr Leah Burns (Griffith University) and Mr Kevin Bradley (RSPCA). It should be noted that members of the expert panel were selected to provide relevant information and opinions to participants to promote discussion, and panel members were not involved in the review process itself.

Rick Engeman, biometrician for the United States Department of Agriculture, greatly assisted by statistically analysing data as part of the fencing case study.

We would like to acknowledge the Butchulla people as custodians of Fraser Island and for their contribution to the review.

To the FIWHA Committees, we appreciate being given the opportunity to present at your combined meeting at Fraser Island, and for your valuable contribution and discussion on the FIDMS and its review.

We would like to thank the many interest groups and members of the community who made the considerable effort to provide written submissions. To everyone who attended the workshop or completed our online survey, we appreciate your time and valuable input which has contributed to this review. Your suggestions and often detailed proposals assisted us in forming our recommendations.

Acronyms

| | |
|-----------|--|
| EHP | Department of Environment and Heritage Protection |
| FIDMS | Fraser Island Dingo Management Strategy |
| FIWHA | Fraser Island World Heritage Area |
| IUCN-WCPA | International Union for Conservation of Nature-World Commission on Protected Areas |
| MCDA | Multi-criteria Decision Analysis |
| NPRSR | Department of National Parks, Recreation, Sport and Racing |
| NRM | Natural Resource Management |
| PINs | Penalty Infringement Notices |
| QPWS | Queensland Parks and Wildlife Service |
| RAM Act | <i>Recreation Areas Management Act 2006</i> |
| RSC | Review Steering Committee |
| RTI | Right to Information (request) |
| TOR | Terms of Reference |

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1 Introduction

1.1 Background

Fraser Island is the world's largest sand island, located off the coast of Queensland, Australia (Figure 1). It was listed as a World Heritage Area in 1992, since which time Queensland Parks & Wildlife Service (QPWS) has been responsible for managing the national park and natural assets within it.

Development of the Fraser Island Dingo Management Strategy (FIDMS) commenced as a QPWS dingo risk assessment in 1998, and was expedited following a fatal incident in 2001.

A full review of the FIDMS was last completed in 2006, which led to the current FIDMS. Various audits and education-based reviews have also been conducted (Figure 2). Reviewing the FIDMS on a regular basis aims to ensure the appropriate management of Fraser Island dingoes, including any risks to residents and visitors.

The Queensland Government recently committed to commission an independent scientific review within its first 100 days.

Fraser Island Location Map



Fraser Island Dingo Management Strategy Review Department of Environment and Heritage Protection

Figure 1 Fraser Island location map

Data Source:

- Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012
- Queensland Government – Department of Natural Resources and Mines

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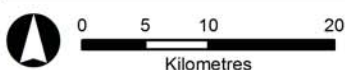
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Note:

This map includes only key locations referred to in the review report (Ecosure 2012)

LEGEND

- Location
- ~ Creek
- Lake



Mapdocument: GW84_FIDMS_001_Fraser Island Location Map
Date: 18/12/2012
Map Projection: GDA 94 MGA Zone 56

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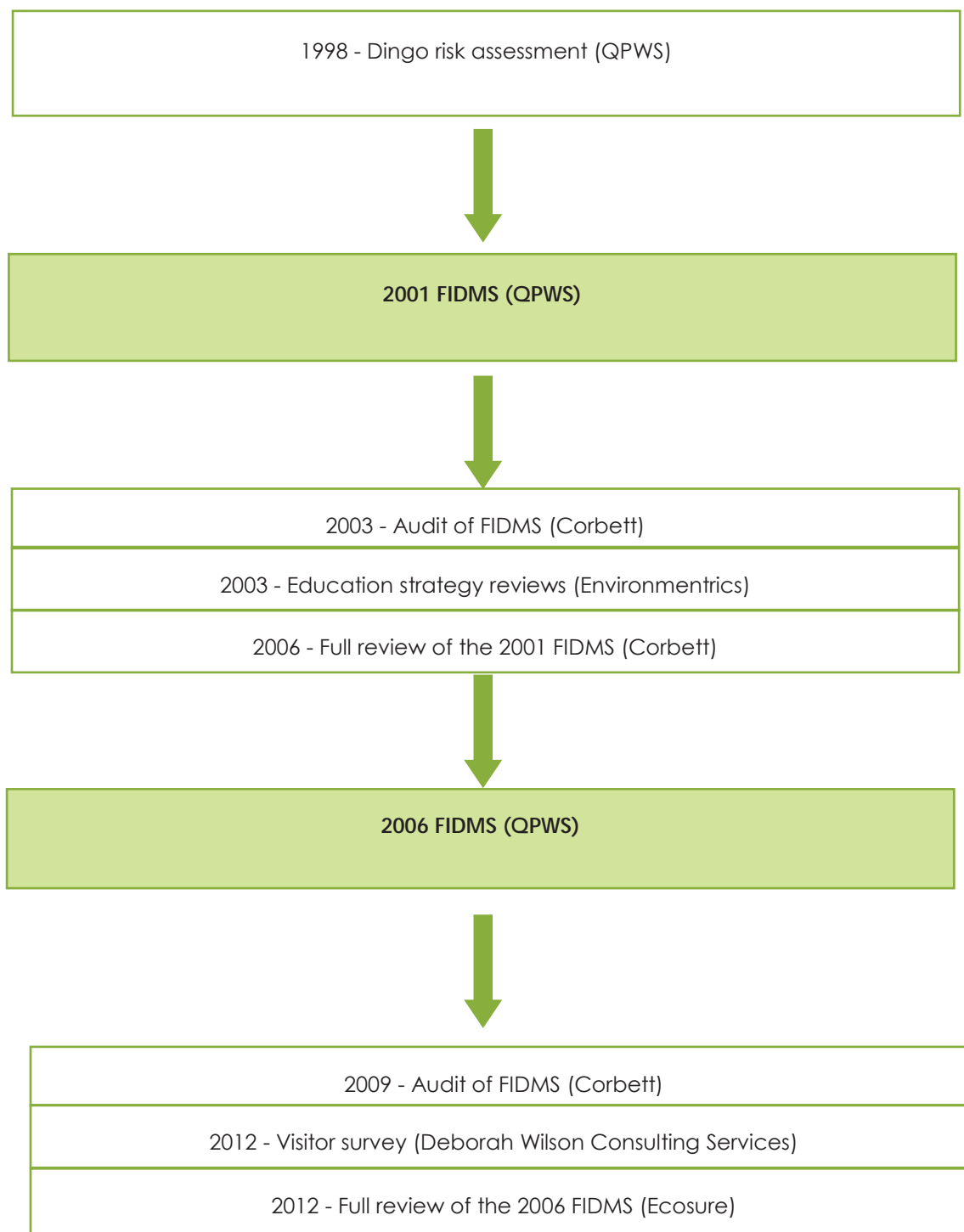


Figure 2 FIDMS formulation and review history

1.2 Review governance

QPWS (within the Department of National Parks, Recreation, Sport and Racing; NPRSR) is responsible for the implementation of the current FIDMS. The Department of Environment and Heritage Protection (EHP) was appointed to independently commission and oversee this review for which Ecosure was engaged. A review steering committee (RSC) was also established to oversee the review process, and provide recommendations to the Minister for EHP. The review governance model is provided in Appendix 1.

1.3 2006 FIDMS objectives and strategies

The objectives of the current FIDMS 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, residents and resort and island staff, and the availability of other sources of human food
- provide Fraser Island visitors with a safe, enjoyable opportunity to view dingoes in an environment as near as possible to their natural state.

There are currently seven strategies within the FIDMS designed to achieve these objectives:

- Comprehensive scientific research and monitoring will be undertaken to ensure the principles and practices of dingo management are sound.
- Awareness programs will continue to encourage appropriate behaviour towards dingoes by island visitors, residents and staff.
- The human-dingo 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.
- Programs will be implemented to modify dingo behaviour and habits that threaten human safety and wellbeing.
- Any dingo identified as dangerous will be destroyed humanely using accepted methods after receiving appropriate approvals.
- 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.
- 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.

The current FIDMS lists the following underpinning principles as the basis for the development of the strategy:

- 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 evidence-base 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.

These have been reviewed, and recommended changes to objectives and strategies made in Section 4.

1.4 Review scope

The broad scope of this review was to:

- evaluate and report on the effectiveness of the current FIDMS (QPWS 2006) in relation to risk management, visitor safety and maintaining a sustainable wild dingo population
- conduct an audit of the actions (outputs and outcomes) under the current FIDMS
- investigate alternative proposals and options and provide a comparison against the FIDMS actions in relation to potential outcomes
- recommend actions for inclusion in a revised FIDMS.

The full review terms of reference are presented in Appendix 2.

This report details methods and findings from the review, and provides recommendations to be considered for future FIDMS.

1.5 Animal welfare

In addition to the conservation of Fraser Island dingoes, the welfare of individual animals is a key concern to the community, management agencies and other stakeholders. The 2006 FIDMS does not explicitly address animal welfare as an independent objective or strategy, instead considering it throughout, together with an acknowledgement of animal welfare and associated ethical considerations as an underpinning principle.

This review has taken a similar approach with the integration of animal welfare issues throughout rather than as an independent topic of investigation. This includes consideration of dingo welfare issues in review of the FIDMS in relation to engineering solutions, education, enforcement, direct actions and research. This same approach was engaged through all aspects of consultation, including the stakeholder workshop, online survey and relevant meetings.

Welfare was similarly a primary consideration when forming recommendations. As detailed herein, the addition of a welfare objective in future FIDMS will assist in providing for best practice welfare outcomes.

1.6 Constraints

Despite substantial effort to obtain comprehensive and accurate data on visitor numbers, such data were not available in a consistently usable format. Data on the number of camper-nights was only available from January 2007, and visitor data compiled for the period 2002 – 2007 (e.g. Fraser Island Sustainable Visitor Capacity Study, DERM 2008) could not be reconciled with the later camper-night data due to inconsistent record keeping. Visitor data are essential for calculating the 'number of incidents per visitor', the key metric needed to properly evaluate the effectiveness of the FIDMS. From the available camper data, the number of incidents per 1000 camper-nights is highly correlated with the total number of incidents ($R^2 = 0.9672$, $df\ 4$, $p = 0.0025$; Figure 3). This suggests that the total number of incidents is reflective of the values adjusted for campers, but this assumes that the number of campers is reflective of overall visitor numbers, which is unknown. For this reason, analyses of changes in incident rates over time could not be corrected for changes in total visitor numbers, although, based on the correlation detected, the results presented in this report are considered to at least be indicative of true incident rate values. Knowing the number of incidents per visitor (not just campers) is essential for evaluating the FIDMS in the future.

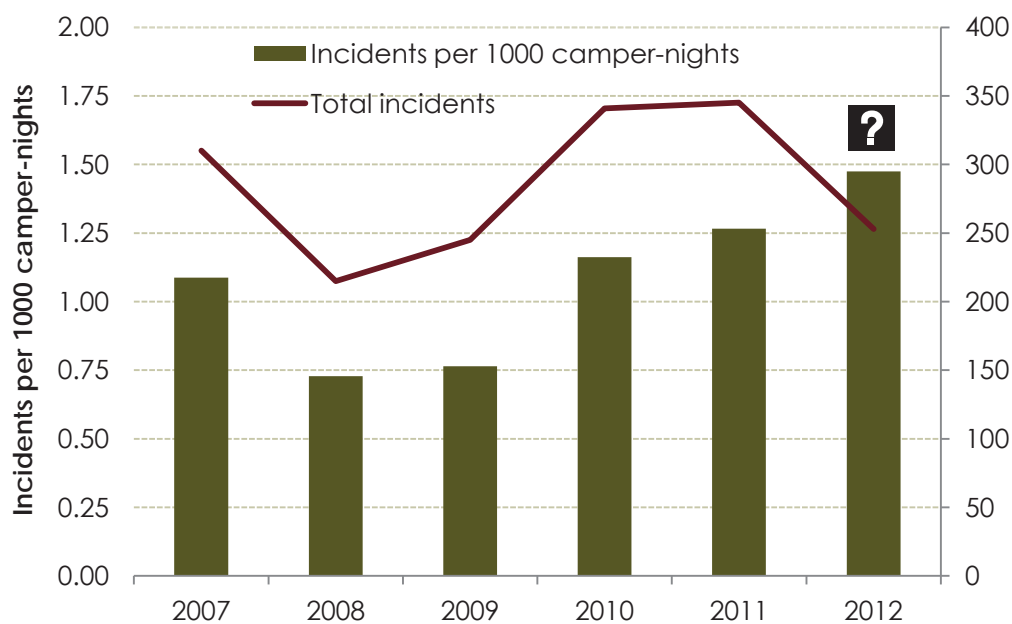


Figure 3 The relationship between the total number of incidents and the number of incidents per 1000 camper nights, 2007 to 2012. Note that data for 2012 was incomplete, and has not been included in the results described in Section 1.4.

There was also a paucity of location records, rates of non-compliance data, briefings data and trap effort data. Thus, many of our analyses were constrained by a lack of key data required to properly evaluate the FIDMS in a quantitative way.

1.7 Legislative and policy framework

Table 1 outlines key legislation and plans relevant to the management of people and dingoes on Fraser Island as a national park, World Heritage Area and recreation area. These provided the framework for the review and recommendations were developed to align with current legislation and policies. Where appropriate, suggestions were also made to revise aspects of these and are included herein.

Table 1 Legislation and planning documents relevant to the FIDMS.

| Instrument | Relevant area | Type | Purpose and relevance to the FIDMS |
|---|---------------|-------------|--|
| Environment Protection and Biodiversity Conservation Act 1999 | Commonwealth | Legislation | The Act provides for the protection of the environment, especially matters of national environmental significance. World Heritage properties are one of the eight matters of national environmental significance. A person must not take an action that has or will have a significant impact on world heritage values of Fraser Island. |
| Native Title Act 1993 | Commonwealth | Legislation | The main objective of this Act is to provide for the recognition and protection of native title. It provides for native title holders to carry out activities that may otherwise be prohibited for the purpose of satisfying their personal, domestic or non-commercial communal needs; and in exercise or enjoyment of their native title rights and interest. This includes protection of cultural and spiritual activities. |
| Nature Conservation Act 1992 | State | Legislation | The objective of this Act is to conserve nature through the protection of native wildlife or an area, ecologically sustainable development and the application of internationally accepted criteria for the management of protected areas. The purpose of this Act is also to classify wildlife as extinct, endangered, vulnerable, near threatened, least concern, international or prohibited and to state the declared management intent for each of the classes. Under this Act the dingo is declared indigenous to Australia and has legal protection in protected areas such as national parks. A dingo cannot be interfered with on a protected area unless a permit or authority has been granted by the chief executive. |
| Nature Conservation Regulation 1994 | State | Legislation | The purpose of this Regulation is to manage the way people may use a protected area under the management principles for the area. Under 'Division 5 – Other Conduct', a person in a protected area must not feed a native animal that is dangerous, venomous, or capable of injuring a person (e.g. dingo). Maximum penalty is 20 penalty units*. |

*Current penalty unit = \$110.00.

| Instrument | Relevant area | Type | Purpose and relevance to the FIDMS |
|---|---------------|-------------|---|
| Nature Conservation (Wildlife Management) Regulation 2006 | State | Legislation | This Regulation applies to wildlife that is not in a protected area. Under the Regulation a person who feeds a dingo anywhere in Queensland can be issued with an infringement notice or be prosecuted. The maximum penalty for an offence is 40 penalty units. A person may be fined the maximum of 165 penalty units if they feed a dingo in a way that may immediately threaten human health or safety. |
| Nature Conservation (Protected Areas Management) Regulation 2006 | State | Legislation | This Regulation applies to protected areas which include national parks and World Heritage areas. Under the Regulation, a person may be given a direction to leave a site to secure the safety of a person or property. It prohibits the feeding of an animal that is dangerous, venomous or capable of injuring a person. Maximum penalty is 40 penalty units. Feeding refers to using food to tease or lure an animal, and attempts to feed an animal. Food must also be kept and secured in such a way as to prevent animal access to the food. Maximum penalty is 40 penalty units. It also restricts the disturbance (including approach, harass, harm, lure, pursue, tease or touch) of an animal. Staff can issue on the spot fines of three penalty units for offences. |
| Recreation Area Management Act 2006 | State | Legislation | <p>The purpose of this Act is for the establishment, maintenance and use of Recreation Areas and to provide, coordinate, integrate and improve recreational planning, facilities and management for recreational areas, with attention paid to the conservation, cultural, educational, production and recreational values of the area and the interest of area landholders.</p> <p>Under Division 3 – Animals and Plants, a person must:</p> <ul style="list-style-type: none"> • not feed or disturb an animal that is dangerous, venomous, or capable of injuring a person (e.g. dingo) in a Recreation Area without the Chief Executive's written approval or a regulatory notice • ensure food in the person's possession or under the person's control is kept in a way that prevents an animal that is dangerous, venomous or capable of injuring a person from gaining access to the food; or if a regulatory notice states the way in which the food must be kept in the stated way. <p>Maximum penalty is 40 penalty units.</p> <p>Staff can issue on-the-spot fines of three penalty units for offences.</p> |
| Recreation Areas Management Regulation 2007 | State | Legislation | This Regulation has been created to supplement the Recreation Area Management Act 2006, and contains specific provisions relating to visitor use of Recreation Areas, including vehicle access and camping permits. |
| Recreation Areas Management Amendment By-law No.1 2001 (amends By-law 1991) | State | Legislation | The By-law has been created to supplement the Recreation Area Management Act 2006, and contains specific provisions relating to visitor use of Recreation Area. Under the By-law a person in a Protected Area or Recreation Area must not feed or disturb animals and must keep food safe from animals. Maximum penalty is 40 penalty units. |

| Instrument | Relevant area | Type | Purpose and relevance to the FIDMS |
|---|---------------|-----------------|---|
| Queensland Heritage Act 1992 | State | Legislation | The purpose of the Act is to provide for the conservation of Queensland's cultural heritage for the benefit of the community and future generations. The Queensland Heritage Register includes a record of protected areas. |
| Animal Care and Protection Act 2001 | State | Legislation | The purpose of the Act is to promote and provide standards for the responsible care of animals, protect animals from unjustifiable pain and ensure the use of animals for scientific purposes is accountable, open and responsible. This is achieved through a number of measures including the provision of regulations, imposing a duty of care, prohibiting certain conduct and authorising officers to monitor compliance. The Act may make codes of practice about animal welfare e.g. in regards to the snaring or trapping of animals. |
| Land Protection (Pest and Stock Route Management) Act 2002 ¹ | State | Legislation | The main purpose of this Act is to provide for pest management. The purpose is achieved by declaring animals and plants to be declared pests, through pest management planning, and building and maintaining fences to prevent movement from one part of a state to another. |
| Land Protection (Pest and Stock Route Management) Regulation 2003 | State | Legislation | This Regulation lists the dingo as a Class 2 pest outside protected areas. Class 2 pests are established in Queensland and have or could have an adverse economic, environmental or social impact. Landowners are responsible for taking steps to keep their land free of these pests. |
| Great Sandy Region Management Plan | State | Management plan | This Plan is considered a management statement for the purpose of providing management direction for the Great Sandy Region, which includes the Fraser Island World Heritage Area. Management of the region also aims to meet international obligations under the World Heritage Convention. It recognises recreational opportunities of Fraser Island. |

¹ The Land Protection Act and Regulation have been included to highlight anomalies in current legislation which are discussed herein.

2 Methods

2.1 Literature review

Literature was obtained in a comprehensive desktop review, and through stakeholder consultation. QPWS provided relevant databases for review and analysis. A complete list of material sourced and utilised as part of this review is provided in the bibliography (Section 5).

2.2 Site assessment

A site assessment was conducted from the 5th – 7th October 2012 to:

- assess on-ground implementation of the FIDMS
- evaluate the effectiveness of engineering solutions (i.e. fences) and identify potential design improvements
- assess the level of implementation of actions as part of the action audit (Section 2.13.2). This included an audit (placement and condition) of facilities and signage. It also included an audit of actions from the Communication plan 2004 and the Communications Implementation Schedule 2010-2015.
- attend ranger dingo briefings and assess the suitability of information provided. This included a briefing in response to a report of a dingo and pups soliciting food.

The remaining time was spent consulting with various stakeholders, as detailed in Section 2.5.

2.3 Multi-criteria decision analysis

Multi-criteria decision analysis (MCDA) was used to directly assess current management strategies and alternative proposals against each key objective recommended for a revised FIDMS: human safety; dingo population sustainability; dingo welfare/wellbeing and visitor experience. Resource efficiency was also included to assist management decisions. Each was categorised as either: low/inappropriate (L); moderate/somewhat appropriate (M); high/appropriate (H); or not applicable (N/A). Where a management action could not be assessed without further research it was identified as having a knowledge gap (KG).

2.4 Management effectiveness evaluation framework

The International Union for Conservation of Nature-World Commission on Protected Areas (IUCN-WCPA) management effectiveness evaluation framework provides a best-practice, internationally endorsed framework for evaluating effectiveness of protected area management programs (Hockings et al. 2006).

The framework involves evaluating each of the following 'elements' of the 'management cycle':

- Context – information that helps put management decisions into context (e.g. values, threats, opportunities, legislation, and political environment).

- Planning – appropriateness of strategies, plans, policies and design.
- Inputs – adequacy of resources (staff, funds, facilities) employed for management.
- Processes – adequacy and appropriateness of management systems and actions designed to achieve management objectives.
- Outputs – services or products resulting from management activity.
- Outcomes – the degree to which objectives have been achieved.

This was used as an overarching framework throughout the review to evaluate components of the FIDMS, and to guide structured discussion and recommendations.

Further detail on the framework is provided in Appendix 3.

2.5 Consultation

Consultation was key to the review process to ensure relevant information was considered as part of the review, and to assess community perception, concerns and alternative proposals.

Stakeholders were identified and categorised through a communication plan developed in consultation with the RSC (Appendix 4).

Detail of all correspondence (i.e. meetings, general consultation) was recorded, and all concerns and suggestions were considered. These are summarised and discussed in Section 3, and alternative proposals are considered in Appendix 5 and Section 3, including assessment against the objectives of the FIDMS using the MCDA method (Section 3.3).

2.5.1 Stakeholder workshop

A stakeholder workshop was held at Maryborough on 5th October 2012. Identified stakeholders and interest groups were invited directly, and a media release by the Minister for EHP was utilised to reach the broader community.

The workshop was structured and facilitated to maximise the opportunity of having a diverse and comprehensive group of participants. The workshop was structured around the four key themes of the FIDMS:

1. Managing people
2. Managing dingoes
3. Research
4. World Heritage, natural and cultural values.

An expert panel format was utilised to provide contemporary information relative to each key theme and to respond to an open floor discussion session.

Focus groups then engaged in detailed evaluation of each theme. This included the opportunity for further discussion with a facilitator to provide an evaluation response to a series of consistent questions and provide further information as required.

It should be noted that members of the expert panel were selected to provide relevant information and opinions to participants to promote discussion, and panel members were not involved in the review process itself. The role of this panel in the review was therefore restricted to their presentation and subsequent participation in the workshop only.

2.5.2 Online survey

An online survey was developed to enable maximum community input, and to provide a comparison of general community knowledge between surveys in order to assist evaluation of the education program.

The Survey Monkey™ platform was used and the community was invited to contribute through a media release from EHP. Information about the survey was also provided at the stakeholder workshop, during general consultation with interested parties and on Ecosure's website. EHP also provided hard copy surveys on request.

Survey questions were designed around education, themes of the FIDMS, values and ethics and demographics. Education questions were taken from previous surveys related to the FIDMS to enable direct comparison of change in knowledge over time. Some of these questions were identified as problematic due to oversimplification or wording issues. Additional response options were included to minimise the impact of such ambiguity. Respondents were able to answer questions as 'definitely true'; 'probably true'; 'definitely false'; 'probably false'; 'unsure'; or to skip the question if they felt it was inappropriate. The survey questionnaire can be found in Appendix 6.

Five statements not included in previous surveys were added to the knowledge section of the online survey to assess respondent's understanding of other key aspects identified:

- All dingoes on Fraser Island are 'pure'.
- There are 'pure' dingoes on mainland Australia.
- Fraser Island dingoes are more important than their mainland counterparts.
- Dingoes are protected by legislation in protected areas (such as national parks).
- Dingoes are protected by legislation outside protected areas (such as national parks).

Data on beliefs, attitudes and knowledge of dingo education messages from the online survey were assessed and compared between user groups and age groups. Data from this survey on preferred methods for receiving information about dingoes were plotted for all respondents, and for those who identified themselves as recreational users of Fraser Island (within the last five years). These data were also tabulated by user group and age group to determine if there were any major differences between groups that might justify targeting them by different methods.

2.5.3 Public submissions

Ecosure accepted and reviewed written submissions from stakeholders, interest groups and members of the public.

2.5.4 Meetings

Ecosure participated in a number of meetings with key stakeholders including:

- RSC – regular progress meetings were held throughout the review process to seek guidance and endorsement of review methods and outputs.
- Fraser Island World Heritage Area (FIWHA) Committees – Ecosure presented at the combined FIWHA Committee meeting held at Fraser Island on the 6th October 2012. This was followed by general discussion, suggestions for management and clarification of the review process.
- QPWS – meetings held with QPWS included participation in the stakeholder workshop, regional staff consultation meetings and FIDMS theme based input during the site assessment.
- Traditional Owners – Representatives of the Butchulla community participated in the stakeholder workshop and also were participants in discussion at the FIWHA meeting in their roles as members of the FIWHA Indigenous Advisory Committee. An offer was also extended for additional consultation during the site visit.

2.5.5 General

Regular phone and email correspondence was maintained with experts and interested parties throughout the review process.

2.6 Education

The QPWS public dingo education strategy, including the QPWS Dingo Communications Implementation schedule 2010 to 2015, was assessed using methods congruent with the previous independent education strategy review (Environmetrics 2003) to the extent that was feasible.

Attempts were made to organise formal interviews of residents, tour operators, accommodation providers and fishers, as conducted by Environmetrics (2003). However these proved unfeasible with the resources available for this review. Instead, informal interviews were held with three residents and a commercial tour operator to identify concerns about effectiveness of the education strategy and suggested improvements.

Review of documentation

All published and unpublished documents relating directly to the Fraser Island dingo education strategy were reviewed. QPWS staff were questioned to clarify the application and scope of internal documents where required.

Given that Beckmann (2010) recently conducted a detailed international literature review, this was used as the primary information source for this component of the review and an additional wide-ranging review of published literature was not conducted.

Review of education products and activities

This review related principally to adequacy of delivery of education products and activities.

Detailed content and design analysis of educational materials and activities was outside the scope of the review.

A complete listing of current education products and activities relating to Fraser Island dingoes, and/or copies of these products were requested from QPWS, along with information regarding distribution methods, target audiences and changes that had occurred since 2003.

Education products were examined to determine whether these reflected the guidelines and recommendations given in the 2004 Dingo Communication plan and the 2009 education review.

Education products were subjectively examined for quality of design. Results of an internal signage audit were examined with regard to comments on condition of signage.

Review of educational messages

Educational messages given in planning documents and presented in education products were assessed. This included consideration of the extent to which messages were consistent with those detailed in relevant planning documents, accuracy in relation to scientific knowledge and concerns raised by QPWS staff and park users.

QPWS interviews

Interviews were conducted with four senior staff involved in overseeing dingo education activities (three people interviewed face-to-face, and one by phone), and four general duty rangers (face-to-face group interview) (questions presented at these interviews are presented in Appendix 7). The questions in this set of interviews were designed to cover each stage of the management effectiveness evaluation framework. For rangers, questions relating to planning and inputs were not included since these elements are outside of their roles and responsibilities.

Feedback from park users

A visitor survey and interviews of tour operators were conducted for QPWS just prior to the current review (Deborah Wilson Consulting Services, 2012). Methods and questions for the Wilson visitor survey component were for the most part the same as those used by Environmetrics (2003), with some modification in the form of several questions having been deleted, and others added. The 2012 report was examined to draw out conclusions and contribute to an evaluation of the effectiveness of the education strategy.

Investigation of social media opportunities

A review of the 2004 Communication plan (Environmetrics 2009) recommended an investigation of the use web-based social media (e.g. Facebook, Twitter, Flickr, blogs, Wikipedia, travel sites with user reviews, mainstream media providing for public comments, websites, blogs).

The current status of the use of social media in relation to Fraser Island dingo management, and opportunities and obstacles for its future use, were investigated through discussion with senior Fraser Island QPWS staff involved in communications, NPRSR staff, and a university professor with expertise in new communication technology.

Information from the online survey (Section 2.5.2) on preferred methods for receiving information on dingoes was examined to determine the extent to which social media might be a preferred option in general or for certain user groups and age groups. Results from the visitor survey (Deborah Wilson Consulting Services, 2012) regarding sources of information used to find out about Fraser Island dingoes were similarly examined.

Comparisons with 2003 education review

Key results were compared, where equivalent, between the current review (including Wilson's 2012 visitor survey) and the 2003 education strategy review (Environmetrics 2003) to facilitate comparison of the effectiveness of the strategy before and since 2003.

2.7 Enforcement

Review and analysis of QPWS documentation

Documentation covering dingo-related enforcement issues was obtained from QPWS. Staff were questioned to clarify the application and scope of these documents where required, and to describe further aspects of enforcement activities and determine what changes in practices or policy, if any, had occurred since 2006.

Spreadsheets were provided by QPWS containing records of penalty infringement notices (PINs) from August 2003 to July 2012, written warnings from December 2004, and dingo-related court proceedings from August 2007. Data on PINs and written warnings were summarised and plotted for each complete year for which records were available. Due to the non-standardised coding of entries and limited time available within the scope of this review, these were examined on an annual basis only.

The relationship between the number of dingo 'incidents' and the number of PINs, as well as PINs plus written warnings, was plotted and visually assessed.

QPWS interviews

Interviews were conducted with three senior staff involved in overseeing dingo enforcement activities (two groups of two conducted face-to-face), and four general duty rangers (face-to-face group interview) (questions provided in Appendix 7). As for the education questions, questions relating to planning and inputs were not included for rangers since these elements are outside of their roles and responsibilities.

2.8 Engineering solutions

Engineering solutions consist of infrastructure and facility improvements designed to reduce the likelihood of inadvertent feeding and negative human-dingo interaction.

Engineering solutions were evaluated against objectives of the FIDMS using the MCDA method (Section 2.3). The effectiveness of fencing to exclude dingoes was also measured using a case study shown in Section 3.8.

2.9 Direct actions

Subjective (e.g. qualitative assessment during the site visit) and objective (e.g. quantitative data analysis) analytical approaches used to evaluate the outcomes and effectiveness of humane destruction, exclusion fencing, hazing and other non-lethal actions included:

- reviewing the appropriateness of euthanasia techniques to ensure compatibility with current best practice
- reviewing the decision-making process surrounding the identification and destruction of a dangerous dingo to ensure that dingoes are not destroyed for unjustifiable reasons
- quantifying the overall frequency of dingo destructions
- evaluating the relationship between the number of incidents and the number of destructions through linear regression analyses
- identifying how many destroyed dingoes were known to have been intentionally or inadvertently fed to assess whether or not fed dingoes are ultimately destroyed
- evaluating the geographic extent of dingo destructions around the Island to assess what proportion of the dingo population is exposed to destruction activities
- quantifying the age, gender and seasonal timing of destructions to assess the potential for destructions to impact on the breeding component of the dingo population
- evaluating the long-term trends in apparent dingo population estimates to assess whether or not there is any suggestion that overall dingo population abundance is declining
- reviewing the suitability of the 'attraction-habituation-interaction-aggression' model for explaining the behavioural process that leads to dingo destruction
- quantifying current levels of hazing and other non-lethal dingo management actions, and review their potential suitability as more prominent management actions in the future.

2.10 Quarterly dingo risk assessments

Methods used by QPWS staff for quarterly dingo risk assessments were reviewed and assessed against the Australia/New Zealand Risk Management Standard (AS/NZS 4360:2004) to identify potential improvements.

Results from the risk assessments conducted since 2001 were tabulated, and categorised by management unit (i.e. Central; Dundubara; Eurong; Waddy Point) to provide a coarse index of change at a spatial level.

2.11 Dingo management records

Dingo management records comprised incident reports, dingo management histories, ear tag registers and humane destruction records. To determine the effectiveness of data management systems, procedures and measures previously taken, these were analysed by:

- reviewing the level of synchronicity between databases to assess whether or not key pieces of data were available in each database

- reviewing the capacity of QPWS to process data and maintain databases at a level amenable to rapid querying and data extraction
- reviewing the type of data collected to assess whether or not all necessary or beneficial pieces of data are being collected to evaluate the FIDMS
- exploring options for improved data capture and entry processes.

2.12 Research and management actions

Information from research and management actions, such as the tagging program and the Fraser Island Dingo Population Study 2009 – 2012, were reviewed. These were evaluated to inform recommendations relating to best practise management strategies and future actions by:

- identifying the level of coordination between research activities to assess whether or not the research activities are contributing to a strategic research direction
- reviewing the availability of unpublished datasets that already have the capacity to provide answers to some outstanding research questions
- identifying gaps in the types of data being collected which, if collected, have the potential to greatly enhance understanding of dingo ecology and management
- reviewing the level of data dissemination to assess whether or not data dissemination practices could be improved
- evaluating the current trapping and tagging program to assess the potential for gains in efficiencies with animal welfare and productivity benefits, and identify new approaches that may deliver those efficiencies
- identifying new applied research activities with the greatest ability to provide data critical for informing and improving the FIDMS.

2.13 Audit

2.13.1 Previous audits and reviews

Previous audits and evaluations of the FIDMS, with a focus on those conducted in the period of the current FIDMS, were reviewed for appropriateness and to recommend improvements.

2.13.2 Level of implementation of current FIDMS actions

The level of implementation of actions from the 2006 FIDMS, 2009 FIDMS audit, 2004 Communication plan and Communications Implementation Schedule 2010-2015 were assessed.

Indicators of action completion were developed in consultation with the RSC to enable objective assessment of implementation. Evaluation also included detail on outputs under each action.

Each action was categorised based on the stage of implementation achieved:

- complete
- ongoing and progressing appropriately (continual actions without an end date, i.e. data collection, that are progressing appropriately; or on going actions that are on track for completion)

- ongoing and requires progression (continual actions without an end date, i.e. data collection, that are not progressing appropriately; or ongoing actions that require progress to be considered on track for completion)
- not yet achieved
- recommended for exclusion.

An overview of the recommendation for each action was given as either: retain (R); modify/combine and retain (M); or remove (Rem); and it was also identified where a new action was recommended (N). Those that were identified to be retained, along with new actions, are included in Section 4. Recommendations were consolidated wherever possible, and only those recommended for complete removal were categorised as recommended for exclusion.

3 Results and Discussion

3.1 Literature Review

Results of the literature review are presented in relevant sections of this document and were used to inform recommendations.

A summary of research that has been published or reported on since the 2006 FIDMS has also been provided in Appendix 8. A summary of key education documents is provided in Appendix 9.

3.2 Site assessment

Results of the site assessment are presented in relevant sections and were used to inform recommendations.

3.3 Multi-criteria decision analysis

Results of the MCDA are provided in Table 2. This analysis provides the framework for discussion of all current and proposed management strategies.

Table 2 Results of multi-criteria decision analysis against each of the key strategy objectives.

| Management activity | Manage human risk | Sustainable population | Dingo wellbeing/welfare | Visitor experience | Resource efficient |
|---|-------------------|------------------------|-------------------------|--------------------|--------------------|
| Current | | | | | |
| Additional lighting at campgrounds | M | H | H | M | M |
| Be Smart Dingo Campaign | H | H | H | H | H |
| Campground ranger program | M | H | H | H | M |
| Capture and restraint (leg-hold traps, noose, physical restraint) | N/A | M | M | N/A | H |
| Consumption of food prohibited at selected day use areas | M | H | H | M | M |
| Cull to a sustainable level | M | L | L | L | L |
| Current quarterly QPWS risk assessment | M | N/A | N/A | N/A | M |
| Designated fish cleaning stations | H | H | H | M | M |
| Ear tagging | M | M | M | M | M |
| Electric grids | H | H | M | M | M |
| Enforcement program | H | H | H | H | M |
| Fencing | H | M | H | M | H |
| Food and gear lockers at campgrounds/picnic areas | M | H | H | M | H |
| Full strategy review every 3 years | H | H | H | H | H |
| Hazing | KG | KG | KG | M | KG |
| Humane destruction - capture followed by lethal injection | M | KG | M | M | H |
| Humane destruction - gunshot | M | KG | M | M | H |

| Management activity | Manage human risk | Sustainable population | Dingo wellbeing/welfare | Visitor experience | Resource efficient |
|---|-------------------|------------------------|-------------------------|--------------------|--------------------|
| Improvements to toilets | M | H | H | M | M |
| Improvements to wash-up and BBQ facilities | M | H | H | M | M |
| Incident reporting | H | H | N/A | M | H |
| Infrared camera monitoring - dingoes | M | H | H | H | H |
| Radio-tracking (using current collars) | N/A | H | M | M | M |
| Research of prey availability | H | H | H | H | M |
| Restrictions on camping sites | M | H | H | M | H |
| Warning/interpretative signage | H | H | H | M | H |
| Proposed and recommended | | | | | |
| Additional information centres | H | H | H | M | M |
| Additional volunteer engagement | M | H | H | H | M |
| Alcohol restriction zones | M | H | H | M | M |
| Aversive conditioning - baiting | KG | KG | KG | M | KG |
| Aversive conditioning - collars | KG | KG | KG | L | KG |
| Breeding and release of FI dingoes to bolster population/genetics | N/A | KG | L | M | M |
| Breeding and release of mainland dingoes to bolster population/genetics | N/A | L | L | M | M |
| Cap visitor numbers and site restrictions | M | M | H | M | M |
| Captive Fraser Island dingoes on the Island/nearby mainland | M | M | M | M | M |
| Care facility on island | N/A | M | H | M | L |
| Care provided to naturally sick/injured dingoes (i.e. tick paralysis) by trained rangers and vets as required | M | L | H | M | L |
| Care provided to sick/injured dingoes (caused by human interference) by trained rangers and vets as required | M | H | H | H | H |
| Closure of certain areas in response to risk | H | H | H | M | M |
| Closure of certain areas permanently | KG | KG | H | M | M |
| Closure of certain areas seasonally | KG | KG | H | M | M |
| Contractual arrangements between visitors and QPWS | M | H | H | M | KG |
| Environmental levy or increased permit costs for conservation | H | H | N/A | H | H |
| Expand education program (i.e. to local schools) | H | H | H | M | M |
| Feeding stations/supplementary feeding | L | L | L | M | L |
| Fence all dingoes on Fraser Island | H | L | L | L | L |
| Focus management entirely on people | L | L | H | M | L |
| Infrared camera monitoring - enforcement | M | H | H | M | H |
| Inspection points at barges to limit food dumping | M | H | H | M | M |
| Inspection points at barges to ensure no taking of flora/fauna | N/A | N/A | N/A | N/A | L |
| Introduction of native prey species (i.e. Eastern Grey Kangaroos) | M | L | M | M | M |
| Management of on-island native prey species | M | H | M | M | M |
| Investigate/trial birth control options for habituated bitches | M | KG | KG | M | KG |
| Limit 4WD access/number to reduce vehicle-related dingo mortality | N/A | H | H | M | KG |
| Limiting visitor numbers to the Island/time restrictions etc | H | H | H | M | M |

| Management activity | Manage human risk | Sustainable population | Dingo wellbeing/welfare | Visitor experience | Resource efficient |
|---|-------------------|------------------------|-------------------------|--------------------|--------------------|
| Minimum age requirement for children visiting Fraser Island | M | H | H | L | M |
| Minimum age requirement for children visiting unfenced areas of Fraser Island | M | H | H | M | M |
| Observation hides to observe dingoes | M | N/A | H | M | L |
| Pellet guns to temporarily mark aggressive individuals | M | M | M | M | M |
| Problem animals relocated to breeding facility/zoo on the mainland | M | H | L | N/A | L |
| Problem animals relocated to wild mainland | L | M | L | N/A | M |
| Relocation of problem dingoes to alternative location on Fraser Island | L | M | L | L | M |
| Removal of pups for captive breeding/education programs | M | M | L | N/A | L |
| Remove all dingoes | H | L | L | L | L |
| Remove all people | H | H | H | L | L |
| Social media engagement (i.e. chat-room/Facebook) | M | H | H | H | M |
| Spatial database to map and analyse information on a spatial scale | H | H | H | N/A | M |
| Utilisation of barges for education | H | H | H | H | M |
| Vaccinate dingoes and administer antibiotics | N/A | KG | KG | N/A | KG |

| | High - appropriate (H) | Moderate - may be appropriate in some situations (M) | Low - never appropriate (L)* |
|--------------------------------|---|--|--|
| Manage human risk | limits direct contact between humans and dingoes and/or appropriate in all situations | does not restrict contact but limits inappropriate behaviour by humans and/or dingoes | does not effectively or appropriately manage human risk |
| Sustainable population | actively promotes sustainability in all situations, reduces need for management of dingoes and allows for natural dingo behaviour | actively promotes sustainability in some situations or at some level will not have adverse impacts on long term viability of the FI population | does not promote sustainability, likely to have adverse impacts on long term viability of the population |
| Dingo wellbeing/welfare | no direct interference with an individual dingo | some direct interference required but standard methods approved by an animal ethics committee | likely to cause unnecessary suffering and is outside standard/approved methods. |
| Visitor experience | allows visitors to safely view dingoes in their natural state and their natural environment | may not directly allow visitors to view dingoes, but encourages appropriate dingo/human behaviour to allow safe viewing in other areas | consistently results in negative visitor experience, or completely prevents viewing in a natural state/environment |
| Resource efficient | benefits outweigh cost in all situations | benefits outweigh cost in some situations | benefits do not outweigh cost |

KG Knowledge gap obvious - research required

* Any management practice that is determined to have low suitability will be excluded, unless adjustment to methods etc. increases suitability to Moderate or High

3.4 Management effectiveness evaluation framework

The management effectiveness evaluation framework was used as an overarching framework throughout the review and was used to guide structured discussion in and recommendations throughout the following sections.

3.5 Consultation

3.5.1 Stakeholder workshop

A total of 65 stakeholders and members of the community participated in the workshop (excluding panel members and facilitators) comprising representatives from:

- Burnett Mary River Group
- Butchulla people
- Dingo Conservation and Education Association Qld
- Durong Dingo Sanctuary
- Fraser Coast Regional Council
- Fraser Coast Tess Wildlife Sanctuary
- Fraser Explorer Tours
- Fraser Island Association
- Fraser Island Defenders Organisation
- Fraser Island Natural Integrity Alliance
- Fraser Island residents
- Fraser Island visitors and general community
- Fraser Island World Heritage Area Committees
- Hervey Bay Electorate Office of Mr Ted Sorensen MP
- Kingfisher Bay Resort
- National Animal Rescue Groups Association
- National Dingo Preservation and Recovery Program
- National Parks Association of Queensland
- Queensland Parks and Wildlife Service
- Royal Society for the Prevention of Cruelty to Animals, Queensland
- Save Fraser Island Dingoes
- Sunfish
- World Society for the Protection of Animals.

Participants were invited to select one of the four themes as their topic for a focus group session. The provision of written feedback on remaining themes was encouraged after the focus sessions.

Figure 4 summarises workshop participants' views on the effectiveness of current strategies under these themes.

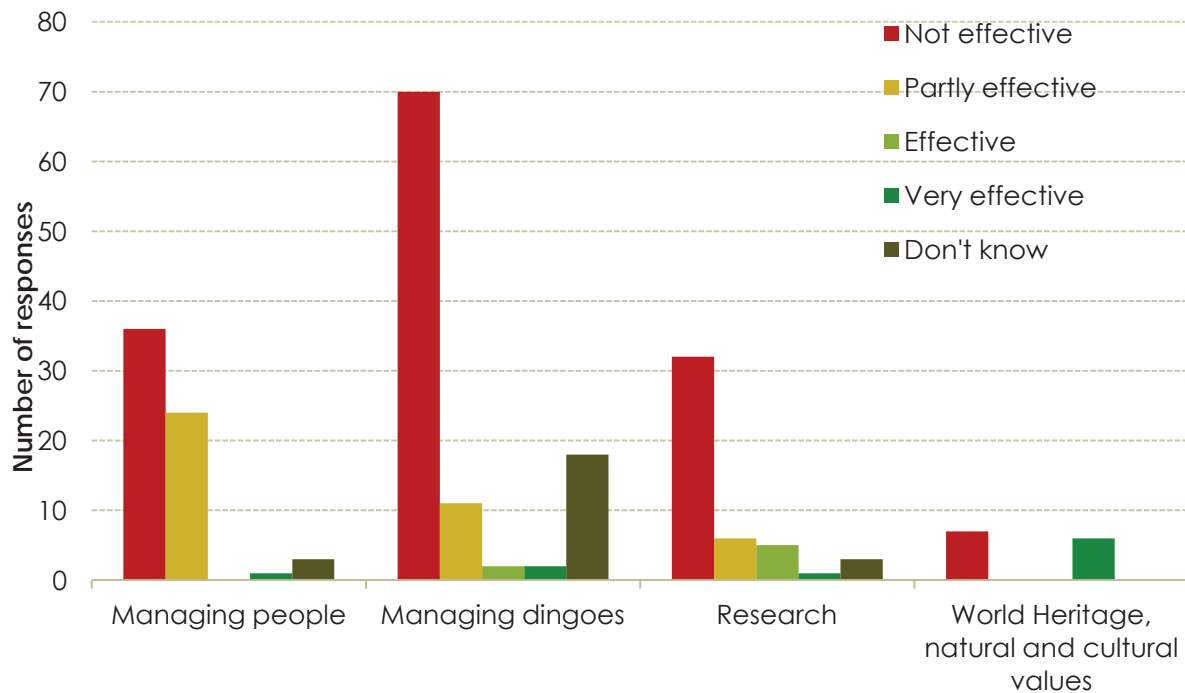


Figure 4 Combined workshop responses for each of the four themes (managing people; managing dingoes; research; world heritage, natural and cultural values) assessing effectiveness against each of the four broad strategies (human safety; dingo welfare; dingo conservation; visitor experience). Therefore each of the 65 respondents had the opportunity to respond up to four times to each key theme resulting in a total of 234 responses.

In summary, participants primarily felt that the FIDMS has been ineffective across all four themes: managing people (52.94% respondents), managing dingoes (81.4%), ensuring appropriate research (54.24%) and providing for protection of World Heritage, Natural and Cultural values (33.33% respondents).

Managing dingoes received the most interest, and also the highest proportion of negative feedback. This was to be expected, with direct management of dingoes being the most publically opposed component of the FIDMS to date. Relatively less effort was required to complete the online survey (Section 3.5.2), which may make that a truer representation of general community views. However similar polarisation and some level of bias is expected from any non-randomised survey.

Strategies under themes 1-3 (managing people; managing dingoes and research) were assessed directly against their effectiveness at meeting FIDMS objectives (total of 213 responses): human safety (Figure 5); dingo conservation (Figure 6); dingo welfare (Figure 7); and visitor experience (Figure 8). The effectiveness of the FIDMS at providing for the protection of World Heritage, Natural and Cultural Values was discussed more generally, as this theme does not directly link to the FIDMS objectives and is beyond the scope of the review.

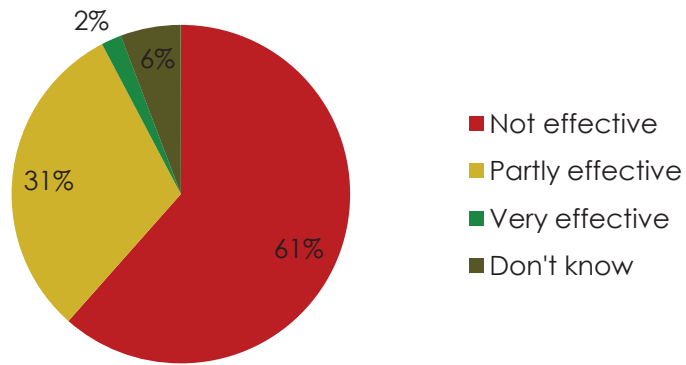


Figure 5 Workshop responses on FIDMS effectiveness at protecting human safety (n=213).

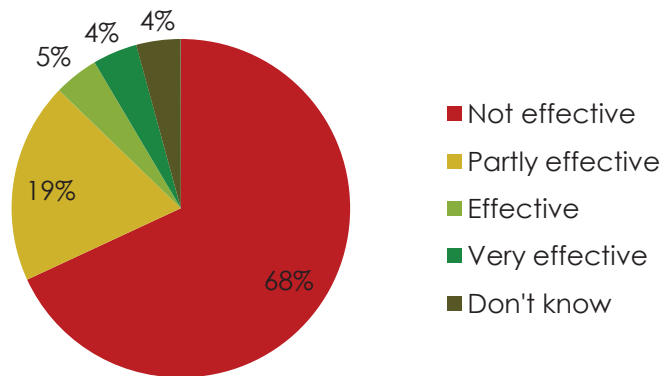


Figure 6 Workshop responses on FIDMS effectiveness at providing for a positive and safe visitor experience (n=213).

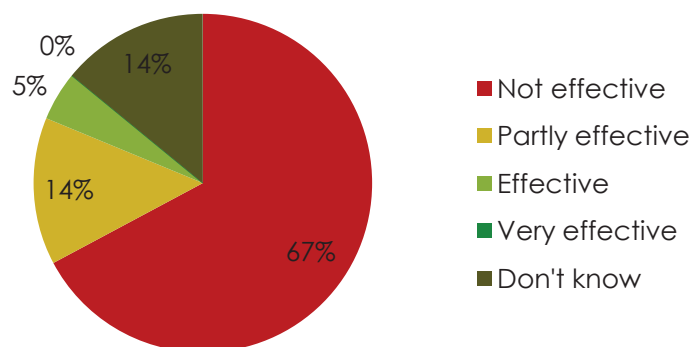


Figure 7 Workshop responses on FIDMS effectiveness at ensuring dingo welfare (n=213).

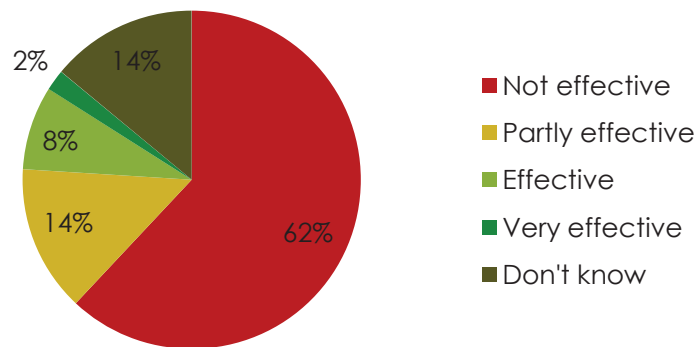


Figure 8 Workshop responses on FIDMS effectiveness at providing for dingo conservation (n=213).

The majority of workshop participants felt that the FIDMS was ineffective at meeting any of its four key objectives.

Workshop proceedings and additional results of consultation were summarised and provided following the workshop. This summary can be found in Appendix 10.

3.5.2 Online survey

476 people completed the online survey. Participants were mainly from Australia (468), with 8 responses from overseas residents from the United States (5), United Kingdom (2) and Croatia (1).

Figure 9 summarises survey participants' views on the effectiveness of current strategies under the four key themes.

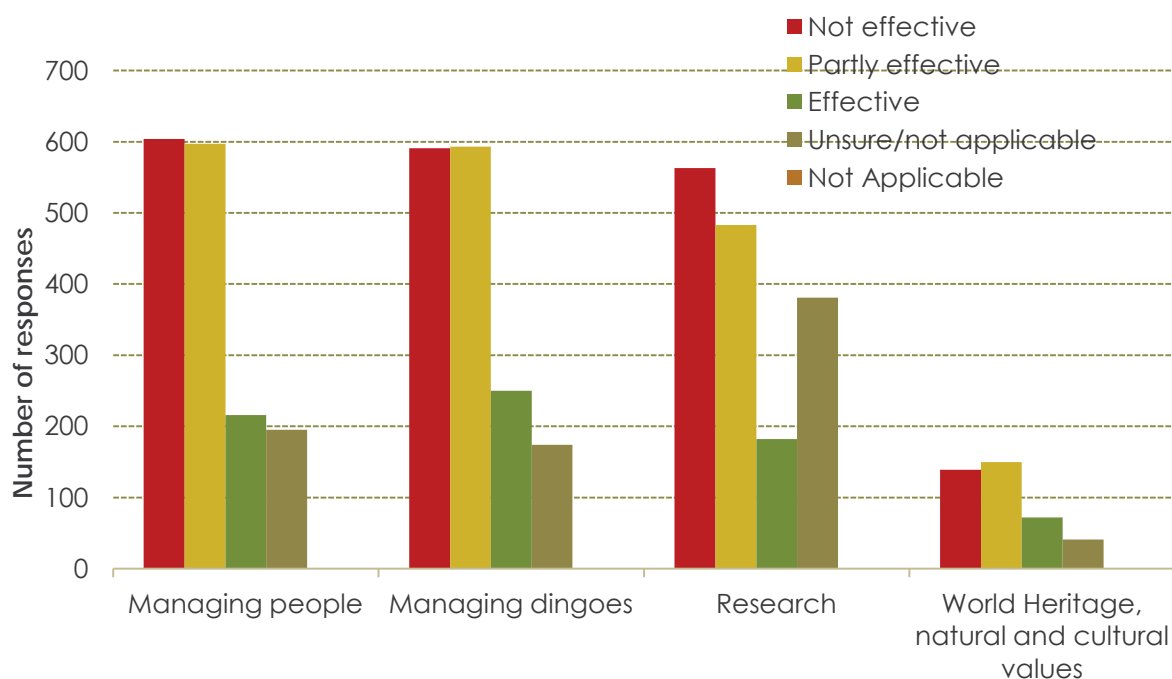


Figure 9 Combined online survey responses for each of the four themes (managing people; managing dingoes; research; world heritage, natural and cultural values) assessing the effectiveness against each of the four broad strategies (human safety; dingo welfare; dingo conservation; visitor experience). Therefore each of the 476 respondents had the opportunity to respond up to four times to each key theme resulting in a total of 4968 responses.

Survey responses show that most participants felt the current FIDMS is not effective at managing people, managing dingoes or ensuring appropriate research. However these were closely followed by responses suggesting that the FIDMS is partly effective at meeting these three objectives. Many participants were unsure how the FIDMS supports appropriate research, which is representative of a lack of effective dissemination of information obtained through research on Fraser Island dingoes.

Although many did not respond to the World Heritage, natural and cultural values section, the majority of respondents felt that the FIDMS is partly effective at protecting these values.

As with stakeholder workshop responses (Section 3.5.1), survey respondents were asked to assess strategies under themes 1-3 directly against their effectiveness at meeting FIDMS objectives: human safety (Figure 10); dingo conservation (Figure 11); dingo welfare (Figure 12); and visitor experience (Figure 13).

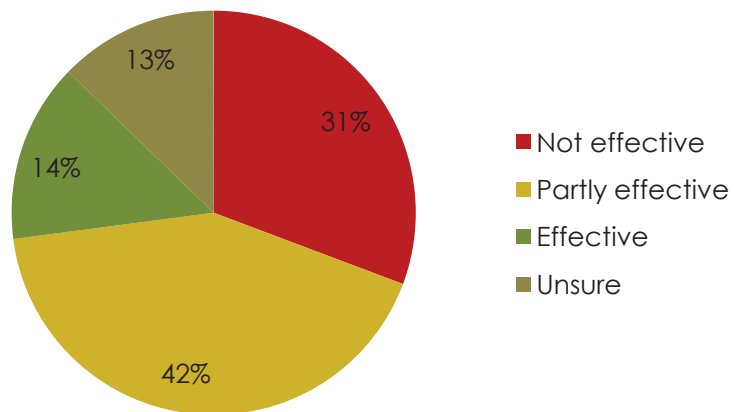


Figure 10 Survey responses on FIDMS effectiveness at protecting human safety (n=476).

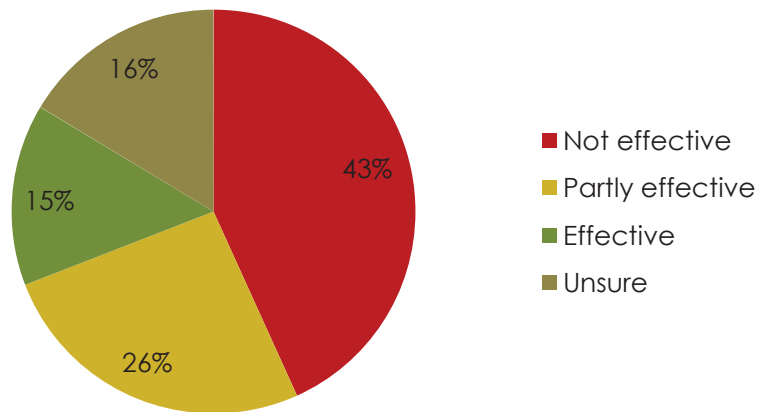


Figure 11 Survey responses on FIDMS effectiveness at providing for dingo conservation (n=476).

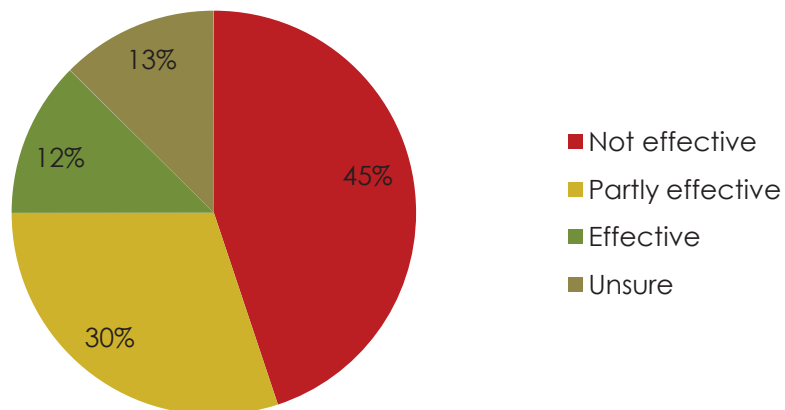


Figure 12 Survey responses on FIDMS effectiveness at ensuring dingo welfare (n=476).

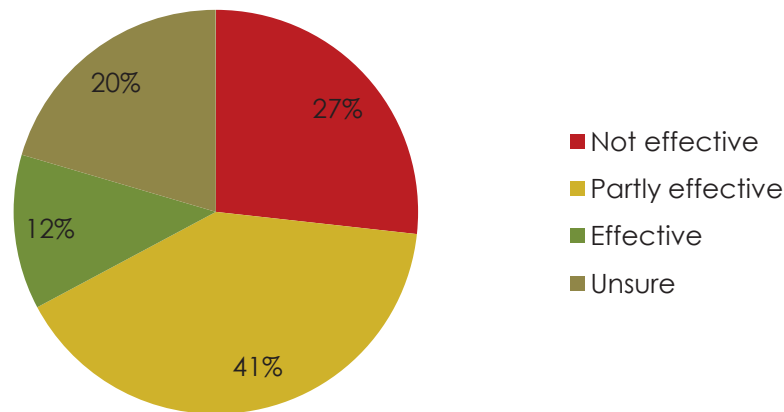


Figure 13 Survey responses on FIDMS effectiveness at providing for a positive and safe visitor experience (n=476).

The majority of survey respondents felt that the FIDMS was partly effective at managing human risk (42%), and providing for a safe and positive visitor experience (41%). However, survey participants felt that it was mainly ineffective at ensuring dingo welfare and a sustainable population.

General knowledge questions were asked to assist evaluation of the education strategy with respect to its impact on stakeholders expected to have a strong personal interest in management of Fraser Island dingoes (in contrast with the group canvassed through previous visitor surveys). Figure 14 and Figure 15 show the proportion of 'correct' responses to each ('Correctness' of response is as designated in the methods of the original visitor survey (Environmetrics, 2003), which reflect the desired responses according to QPWS educational messages. Participants were free to skip questions which accounts for slight variation in the total number of responses between questions.

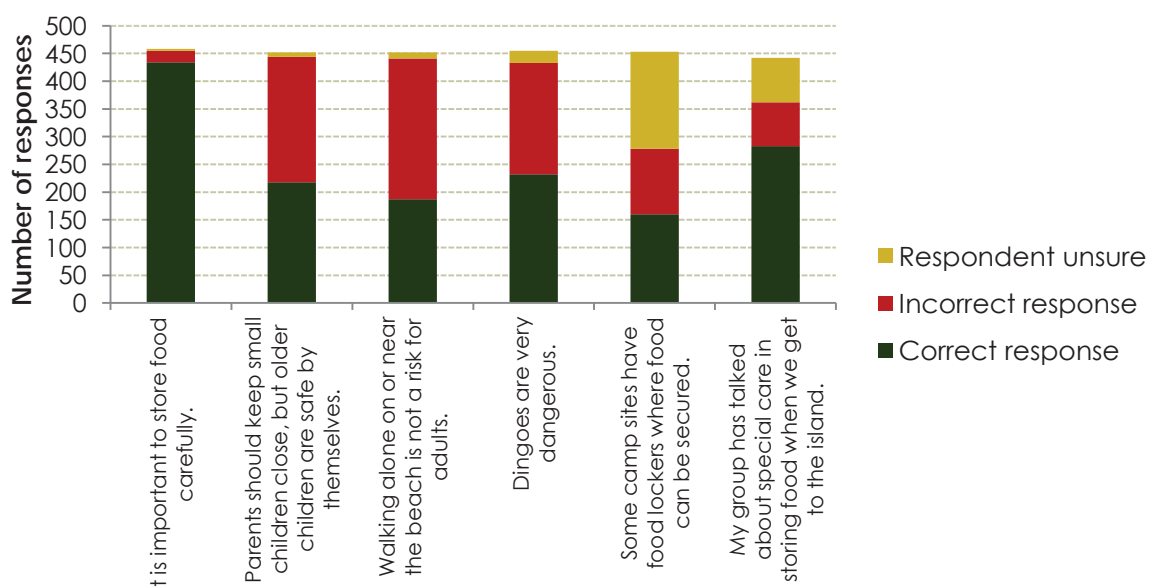


Figure 14 Responses to the first general knowledge true (definitely true/probably true) or false (definitely true/probably false) question (n=459).

Figure 14 shows that most participants are aware that it is important to store food carefully, and suggests that this message is being communicated effectively.

It also shows that most (64.02%) groups had talked about taking special care in storing food before arrival, but that some had not (17.88%) or were unsure (18.1%).

The correct response to the statement 'dingoes are very dangerous' was identified in previous surveys as 'true'. To account for the poor wording of this statement, while still focusing on the message QPWS are trying to communicate, responses were considered correct if answered 'definitely true' or 'probably true'. The QPWS message that dingoes are dangerous in some situations appears to have been effectively conveyed to half of respondents (50.98% in total; 28.79% responding 'definitely true' and 22.19% 'probably true'). Remaining respondents felt this was either definitely false (26.6%) or probably false (17.55%) with less than 5% unsure. These responses suggest that education messages could focus more on the realistic dangers posed by dingoes rather than instilling fear into visitors ('definitely true'), and that some respondents appear not to be aware or do not believe that there is some level of danger associated with dingoes ('definitely false'). Supportive of the latter, it appears that a large number of respondents are not aware of, or do not agree with, the education message that adults and older children should stay in groups and avoid walking on their own. The majority (64.68%) of respondents were also unaware that food and gear lockers are available at many sites, which indicates a need for better communication of such facilities, and perhaps a requirement for more lockers at unfenced locations across the Island. However, this result may also be representative of a large number of people camping in fenced areas, where lockers are not required.

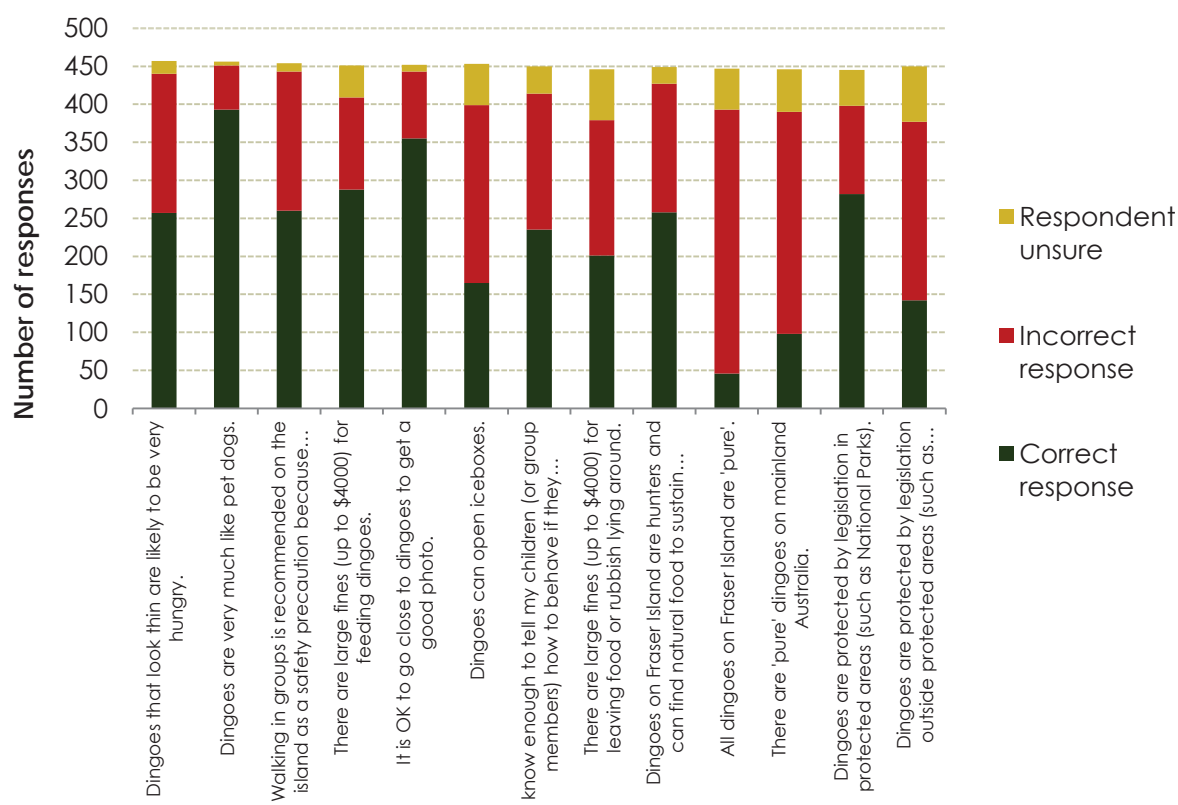


Figure 15 Responses to the second general knowledge true (definitely true/probably true) or false (definitely true/probably false) question (n=460).

Figure 15 shows that the majority of respondents are aware that dingoes are not like pet dogs, although of concern 58 participants felt that may be very much like pet dogs with a further 5 being unsure. Educating visitors that dingoes are closely related to wolves and do not behave like pet dogs should be a priority to encourage appropriate behaviour.

Most respondents are aware that walking in groups is recommended. However while people are aware this is advised, as shown in Figure 14 many do not see it is as a risk to walk alone.

The majority of respondents are aware that they should not go close to a dingo for a photo (78.54%), and that large fines apply for feeding dingoes (63.86%). However, many were not aware that fines also apply for feeding dingoes (36.14%) or for leaving rubbish accessible to dingoes (54.93%). 63.58% of respondents were also unaware that dingoes can open ice boxes. These messages should be more clearly communicated to avoid intentional or inadvertent feeding.

The three misconceptions most apparent in Figure 15 are that all dingoes on Fraser Island are 'pure' and that there are no 'pure' dingoes on mainland Australia. Both of these statements are false, and this knowledge gap may help explain the somewhat overstated focus on Fraser Island dingoes compared to conservation of the species in general. While most respondents are aware

that dingoes are protected in protected areas (63.37%), many did not know they are not protected outside these areas (68.44%) (and are in fact a declared pest outside protected areas – Section 1.7).

Most participants (57.46%) agree that dingoes are natural hunters that can find natural food to sustain themselves, while some either did not agree (37.64%) or did not know (4.90%). This message should be clearly communicated to assist eliminating illegal feeding.

47.8% of people also felt that they did not know enough to tell other members of the group how to behave if they encounter a dingo. This supports the general finding of inconsistencies in key education messages and their delivery, and must be immediately addressed to ensure people react appropriately to avoid incidents.

In responding to the online survey (Appendix 6), most people answered 'correctly' (in relation to intended QPWS messages) to most of the dingo knowledge questions – more so than in the visitor survey (Section 3.6). The main exceptions were that most believed that all dingoes on Fraser Island are 'pure' many believed that 'dingoes that look thin are likely to be very hungry', and many were not aware that some campsites have food lockers where food can be secured. Many people did not believe that 'dingoes are very dangerous'; however this question is ambiguous and emotive and should be reworded in future surveys.

Figure 16 provides responses to the values section of the survey. Participants were asked to rate how they valued each FIDMS objective from 1 to 5 (with 5 being extremely important, and 1 not at all important).

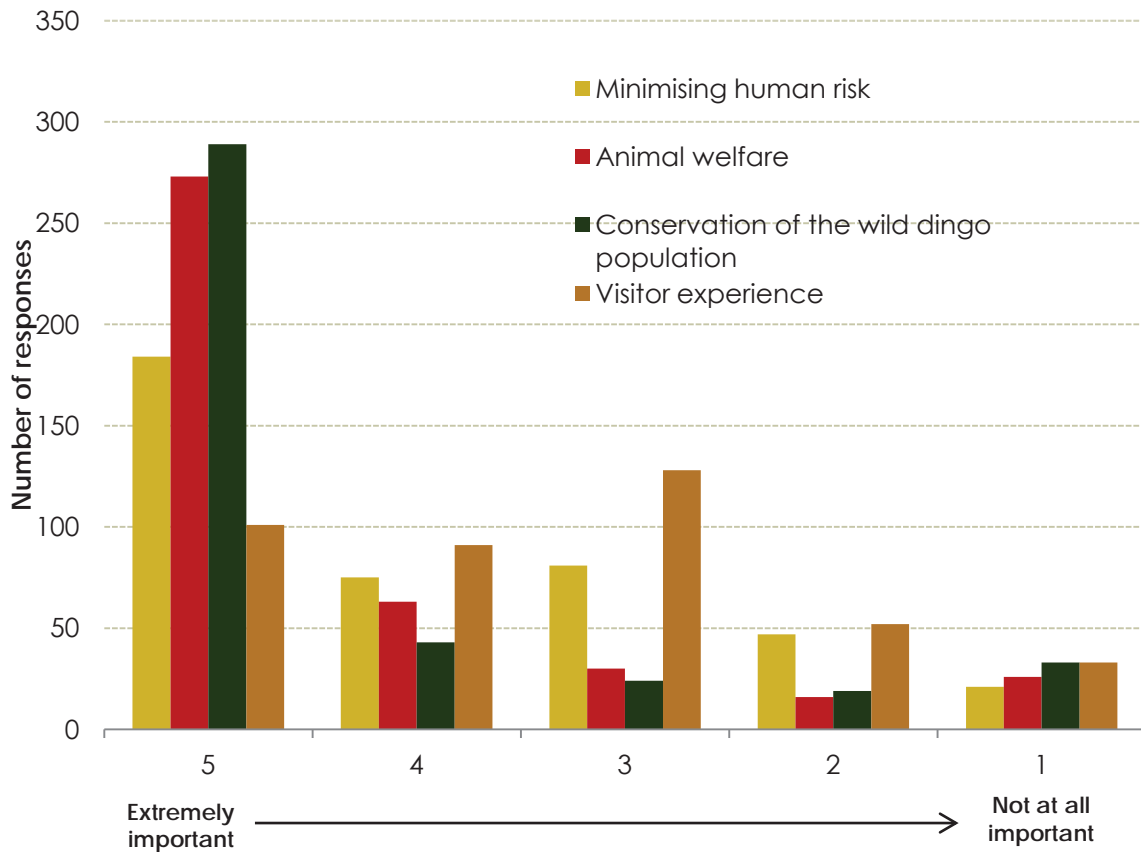


Figure 16 Survey respondent values of each FIDMS objective from 5 (extremely important) to 1 (not at all important) in the context of Fraser Island (n=408).

Most survey participants felt that conserving the wild Fraser Island dingo population was extremely important, as was animal welfare and minimising human risk. There was more variation between respondents in the importance placed on visitor experience, although most found it to be moderately important. Relatively few people felt that any of the four objectives were not at all important.

Figure 17 shows people's responses to the ethics question in the context of Fraser Island dingoes.

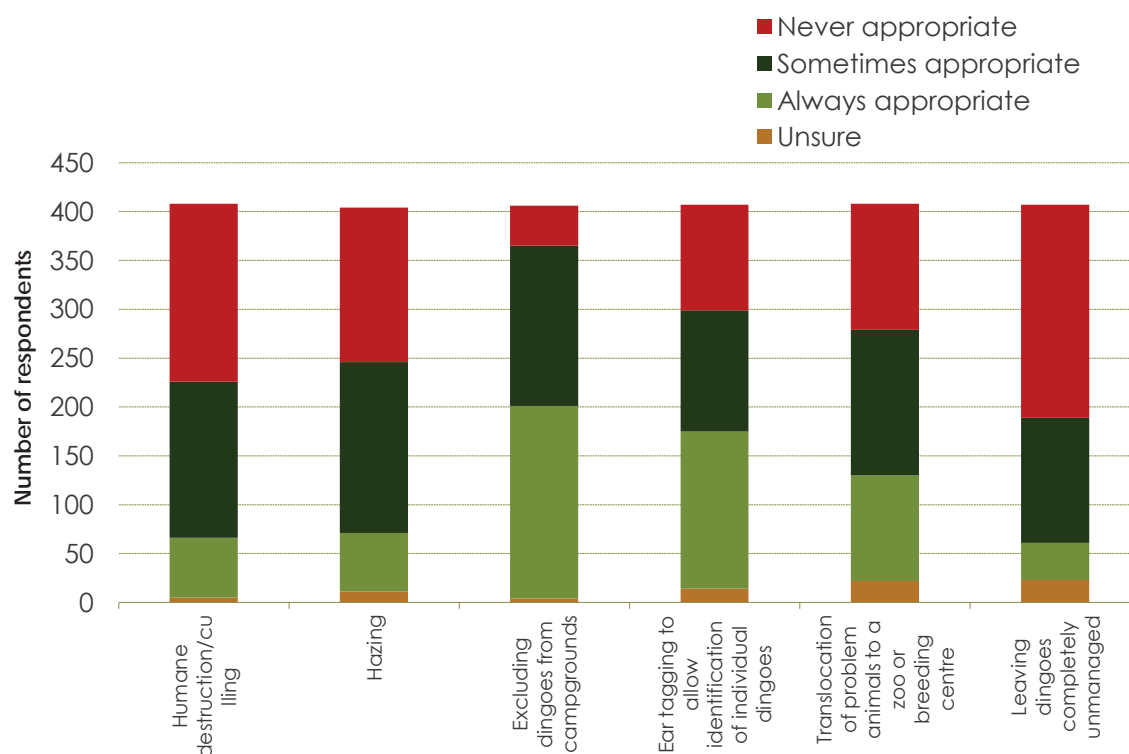


Figure 17 Survey respondent views on the appropriateness of various management techniques within the current FIDMS.

The majority of respondents felt that humane destruction and/or culling is never appropriate (44.61%), followed closely by appropriate in some situations (39.22%). Some respondents felt that it was appropriate in all situations (14.95%).

Most respondents felt that hazing is sometimes appropriate (42.89%), with a large number opposing hazing in all situations (38.73%). 14.71% felt that hazing is appropriate in all situations.

Only a small number of respondents felt that excluding dingoes from campgrounds is not appropriate (10.05%), with the majority feeling it is always appropriate (48.28%) or sometimes appropriate (40.20%). This shows a general acceptance of barrier fencing.

69.85% of respondents felt that ear tagging is always or sometimes appropriate (39.46% and 30.39% respectively). 26.47% were completely opposed to ear tagging.

Only a small proportion of respondents felt that leaving dingoes completely unmanaged is always appropriate (9.31%), with the majority feeling it is never appropriate (53.43%) or sometimes appropriate (31.37%).

Respondents to the online survey indicated their top three methods for receiving information on Fraser Island dingoes. Whether including all respondents (Figure 18) or limiting the analysis to recreational users (Figure 19), the following methods were most preferred: websites, during transit to the Island or in person by QPWS staff. These preferences applied whether considering only the highest ranked preference, or the three top preferences combined.

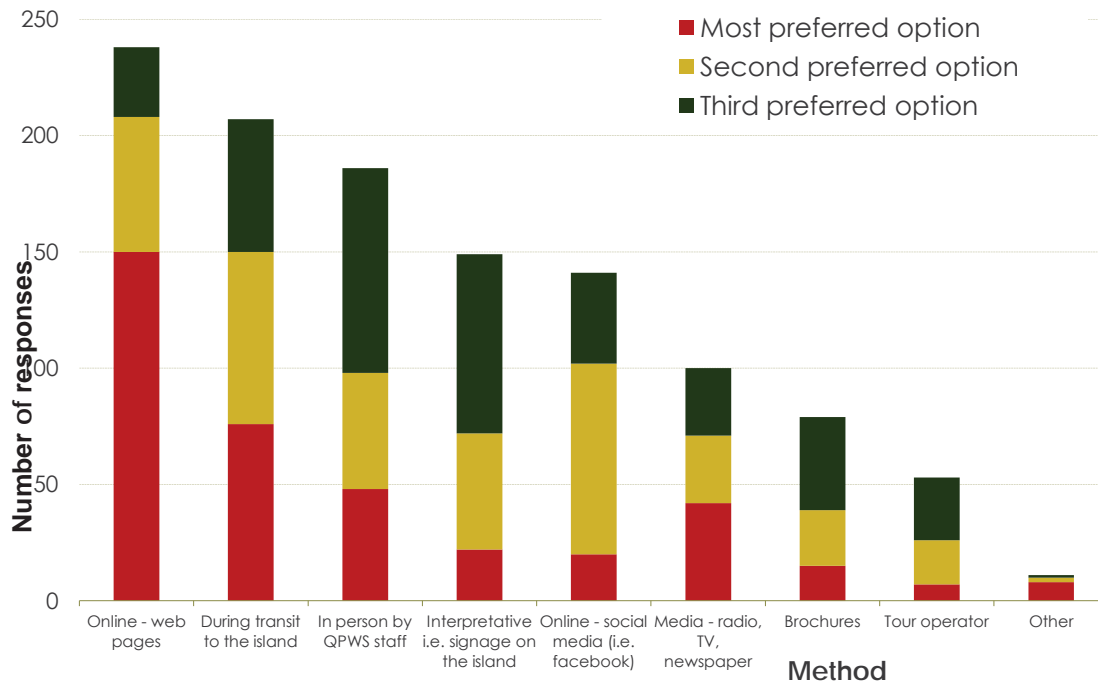


Figure 18 Preferred methods of receiving information relating to dingoes on Fraser Island – all respondents (n=575).

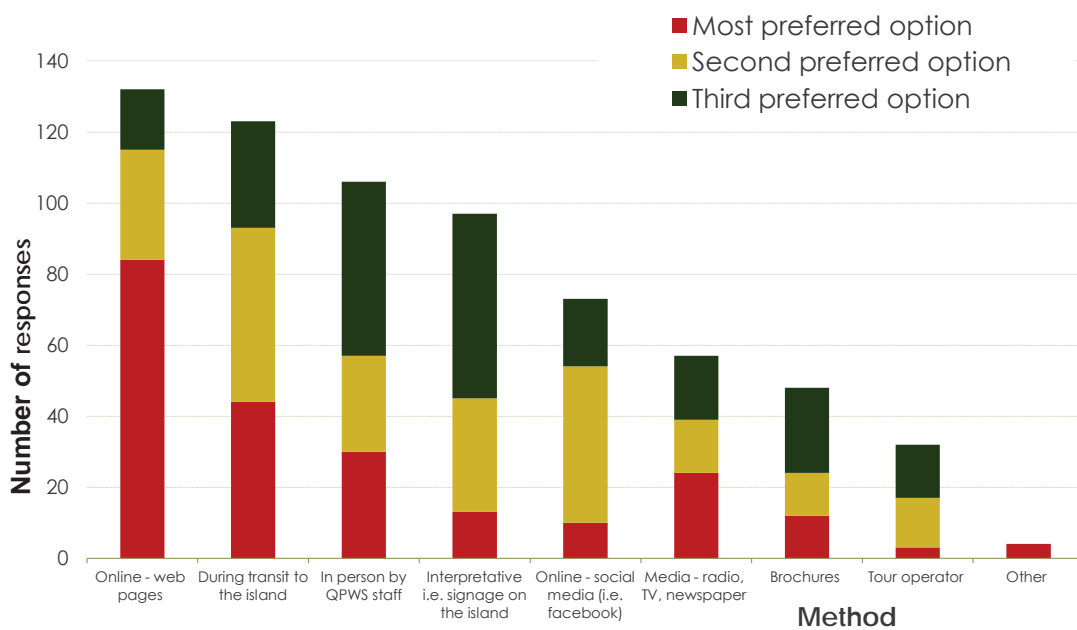


Figure 19 Preferred methods of receiving information relating to dingoes on Fraser Island - Recreational visitors to Fraser Island during the last five years (n=233).

Exploration of preferred communication methods between age groups revealed that these were also the top three preferred methods for all age groups, except for those aged more than 65 years. For this group, websites were still the top preference, while online social media was the second most preferred method, followed by in person by QPWS staff. There were also no major differences in preferences between user groups, although recreational visitors had a stronger preference for interpretive information on the Island than did the other groups.

Comparisons between actual sources of information used by respondents to the 2012 visitor survey and preferred sources cited by the online survey respondents are difficult to interpret, given that the two population samples are likely to be quite different and that method preference were not identified in the visitor survey. However, some broad statements can be made. In both cases, personal delivery by QPWS staff ranked fairly high. For the online survey respondents, preferences for use of websites and social media ranked much higher than did usage of these media by visitor survey respondents. It seems likely that this largely reflected the online survey group having a strong personal interest in the FIDMS than the visitor survey group, thus making web-based media more likely to be relevant to this group.

3.5.3 Workshop and survey combined

Overall views represented by combined workshop and survey responses are shown in Appendix 11. Results have been discussed separately above rather than discussion on combined results, as it is likely that views expressed during the workshop are overrepresented with many people who made the effort to attend the workshop also expressing interest in responding to the survey.

3.5.4 Public submissions

A total of 32 submissions from a range of stakeholders and interested community members were reviewed and considered in the review. These included:

- Butchulla people (2)
- Durong Dingo Sanctuary (1)
- Fraser Island Defenders Organisation (1)
- Fraser Island Association (1)
- Fraser Coast Wildlife Sanctuary (1)
- Island residents (1)
- Island visitors and interested community members (23)
- National Dingo Preservation and Recovery Program (1)
- Save Fraser Island Dingoes (1).

Key concerns raised in these submissions are discussed throughout Section 3, and an assessment of alternative proposals against objectives is provided in Section 3.3. Alternative proposals are further discussed in Appendix 5, and subsequent actions and recommendations are included in Section 4.

3.5.5 Meetings

RSC – the RSC provided advice, review and endorsement of methods and recommended actions from these meetings were continually incorporated into the review process. EHP provided executive support, including provision of minutes from each meeting. The governance model for the review is provided in Appendix 1.

FIWHA Committees – a general outcome of support for the existing strategy was evident from the FIWHA Committees. The key issues that have been integrated to the actions and recommendations herein include:

- the need for greater consultation with indigenous community
- confirmation of opportunities to further contribute to the review subject to Ministerial consideration of the review report
- difficulties with managing visitors attitudes and how this impacts opportunities to modify behaviour/actions
- potential for greater use of early intervention in dingo management
- potential to highlight other significant values of visiting Fraser Island to offset current focus on viewing dingoes
- greater use of barge travel for education of visitors.

3.5.6 General

Results from general consultation are incorporated throughout the report and discussed in relevant sections.

As part of the consultation process, a range of written correspondence was exchanged between various stakeholders and was considered as part of the review.

Alternative proposals are further discussed in Appendix 5, and subsequent actions and recommendations are included in Section 4.

Key concerns arising from consultation have been analysed and grouped into the following categories:

- artificial feeding
- cultural, including indigenous values and the rights of traditional owners
- dingo population issues including carrying capacity and prey availability
- dingo welfare issues including in relation to culling, welfare and management
- education of residents and visitors in relation to artificial feeding, human safety, discouraging interactions and the impacts of tourism
- fencing
- fire management
- QPWS management including ranger presence, staff capacity, reports and monitoring and interpretation strategies

- tourism/visitor experience
- tourist/visitor behaviour, attitude and numbers (including impacts of vehicles).

As per consultation results, the majority of workshop participants and survey respondents evaluated the strategy as ineffective in achieving its aims across all themes.

Input from the FIWHA Committees indicated a generally high level of support for the current strategy, including acknowledgement of the strategy by FIDO, FINIA and FIA.

These issues have been considered and addressed throughout this review, including in Appendix 5 which presents specific alternative proposals for management as provided during the review process.

3.5.7 Community concerns and alternative proposals

Specific proposals have been grouped into general themes (i.e. feeding stations, introduction of native/introduced prey, direct feeding, etc. have been categorised as supplementary feeding) and each individual proposal responded to within that category.

The alternative proposals suggested through the review consultation include:

- supplementary feeding
- relocation
- a captive centre on Fraser Island or mainland
- breeding and reintroduction
- remove all dingoes
- remove all people
- fence all dingoes on Fraser Island
- veterinary care facilities on Fraser Island
- vaccinating dingoes
- cease/change ear tagging
- inspection points at barge landings
- camera surveillance enforcement
- management to be focused solely on humans
- installation of observation hides
- contractual agreements between QPWS and visitors
- minimum age requirement for children visiting Fraser Island /camping outside fenced areas
- capping visitor numbers/vehicle permits
- additional visitor information centres
- expand education programs and delivery forums
- increase volunteer engagement
- environmental fee/increased permit costs

- birth control options for habituated dingoes.

Refer to Appendix 5 for responses to alternative proposals, which should be read with referral to the MCDA provided in Section 3.3.

3.6 Education

Review of documentation

Appendix 9 presents a summary of key initiatives, planning and evaluation documents relating to the education strategy since its inception.

The 2006 FIDMS contains a list of 24 education-related actions. It does not include any objectives related specifically to education. Instead it seems to implicitly consider education to contribute to the overarching objectives of the FIDMS through its influence on public behaviour. It refers to the Communication Plan 2004 as the main document guiding the dingo communication strategy and summarises the main components of that Plan. In addition to stating the message themes specified in the Communication Plan, it lists ten more specific education messages that should be communicated. These messages are slightly different from the 'extended messages' presented to cover a wider scope of issues in the Communication Plan. It seems more appropriate, and will avoid potential confusion, if detailed messages are confined to the Communication Plan, which can also provide more readily for updates in the face of new knowledge.

Since its release, the 2004 Dingo Communication Plan (Environmetrics 2004) has remained the key planning document guiding education relating to Fraser Island dingoes. The Plan specifies educational messages that should be communicated. It recommends developing a message hierarchy for dingo-related messages, with 'extended messages' under the key message themes of protecting children, staying safe, safeguarding food and understanding dingoes, and gives suggestions for these extended messages. The Plan provides:

- information on target audiences and how best to reach them
- general guidelines for effective message delivery
- a list of 'landmark objectives', which are actions to be achieved or outputs to be produced in addition to those given in the FIDMS
- detailed specific suggestions and guidelines for maintaining and improving communication with the various audience groups
- recommendations for development of outcome-based performance indicators, with guidelines and examples.

External evaluations of the education strategy since 2003 comprise:

- a brief consultancy review of the 2004 Dingo Communication Plan (Environmetrics 2009)
- a draft report on a visitor survey conducted in 2012 (Deborah Wilson Consulting Services 2012) (results of which are reviewed under the 'feedback from park users' section below).

Environmetrics (2009) reviewed the effectiveness of the 2004 Communication Plan, but without any objective evaluation methods and written largely by the same author. They concluded that

the Plan was well-structured and had provided strong and effective guidance for communication activities up till that time. They further concluded that most objectives in the Plan had been achieved, except for:

- engagement with other government departments to establish guidelines for presentation of dingo information by off - park enterprises
- use of surveys to measure effectiveness of the dingo education campaign.

The authors recommended development of a new plan using a hierarchy of outcomes to relate goals, objectives and actions to performance measures, but with inadequate detail and explanation to show how this should work. They also identified several new communication challenges (drawing largely from the literature review later published in Beckmann (2010)), which were recommended for consideration in a new Communication Plan. As part of this, they noted the existence of myths and misconceptions that should be addressed by developing and incorporating new educational messages.

Actions to be incorporated in the next Plan were proposed including to:

- develop and implement an issue management plan
- regularly renew signage
- conduct visitor surveys every five years at a minimum
- monitor and respond appropriately to social media
- make additions to the QPWS website
- develop 'beyond basic behaviour' education messages
- gather and promote information on QPWS as effective dingo managers
- build public perception of QPWS rangers as authorities in natural resource management
- review the 'Fraser Island Visitor Guide'
- consider additional resources to assist rangers with face-to-face education activities.

The FIDMS objectives adequately cover desired ultimate outcomes of the education strategy. However, the absence of a hierarchy of objectives dealing with intermediate objectives of education in both the FIDMS and Communication Plan limits appropriate planning and evaluation. This hierarchy should be developed to show the link between knowledge, attitudes and beliefs, public behaviour in relation to dingoes and FIDMS objectives. Each of these levels should be associated with periodic monitoring and performance indicators.

The main document produced since 2003 that provides context for the FIDMS and associated planning documents dealing with education is the detailed literature review of key international dangerous wildlife communication strategies by Beckmann (2010). The report concluded that the Fraser Island dingo education program is still one of the best available internationally in terms of its theoretical foundation, audience analysis, range of media, quality of media and incorporation into a broader wildlife management strategy. However, it identified the Fraser Island dingo education program as falling behind international best practice in relation to:

- Lack of national and international recognition of Fraser Island *Dingo-Smart/Safe* strategies, resulting from lack of peer-reviewed literature from the perspective of the management agency concerned (QPWS in this case), and lack of articulation of the premises of the *Dingo-Smart/Safe* strategies. The report recommends publication to address these gaps.
- Lack of effective reporting and evaluation of communication strategies focused on encounters with dangerous wildlife in the international literature. The report recommends direct contact with experts in relevant management agencies overseas to update knowledge on available management options as they might apply to Fraser Island dingo management.
- Lack of incorporation of current thinking in persuasion theory and social marketing into the dingo safe strategy. The report recommends these be explored and incorporated into planning.
- A need to investigate incorporation of a Web 2.0 context (usually referred to now as 'social media') into *Dingo-Safe* data collection and message dissemination processes – (a) to track visitor behaviour and responses to *Dingo-Safe* messages; and (b) as potential new two-way dissemination/communication media with Fraser Island audiences.

Together, the FIDMS 2006, Communication plan 2004 and Implementation Schedule 2010-2015 list 50 education-related actions, all of which are used to guide planning. The new draft Community Engagement Plan includes a further long list of actions, but little context. Components of the context and plans for the education strategy are split between all these documents, without any logical structure to clearly link them. This makes it difficult to ensure implementation and accountability. Meanwhile, recommendations within the Communication plan for its further development have not yet been implemented.

These difficulties would be overcome if the draft community engagement plan were replaced by an updated communications and community engagement plan, which draws together and builds on context and recommendations from Environmetrics (2003), Beckmann (2004), Environmetrics (2009), Beckmann (2010) and the present report. This new plan could serve as a stand-alone document for guiding planning and evaluation of the education strategy and community engagement relating to Fraser Island dingoes. This document should present a logical framework including a hierarchy of objectives or outcomes (linked to the overarching objectives in the FIDMS), logically structured actions, and performance indicators to facilitate future objective evaluation of achievement and effectiveness of the plan..

Meanwhile, the FIDMS should continue to serve as the key public document specifying the main objectives and important ongoing actions for the education strategy, and referring to the (updated) communication plan for details.

Review of education products and activities

Public education regarding Fraser Island dingoes is a collaborative effort by staff at various levels of QPWS. All Fraser Island rangers have a public contact component to their duties, particularly through briefings to newly arrived campers, but also when opportunities occur during the work day and while on 'compliance runs'. Two public contact rangers provide a central point for provision of education services on the Island, such as development of new text, developing conditions reports and management of signage. These rangers are skilled in developing education products, and about 40% of their workload relates to education. Recently a new

community engagement ranger position was assigned to the Natural Resource Management (team on Fraser Island. Island staff are supported by specialist interpretive staff at regional level who are responsible for overall planning of educational activities, and by the relevant QPWS unit.

Detailed records have been kept by QPWS of Fraser Island dingo education products and activities implemented since 2003. However these have not previously been comprehensively summarised. For the purposes of this report, these products and activities, along with distribution methods, target audience and changes made since 2003 have been listed and categorised (Appendix 12). Further development and ongoing updating of an 'education products spreadsheet' such as this should aid strategic planning and evaluation (both internal and external),

A large number of dingo-related education products and activities are provided through many distribution methods and locations, both on and off Fraser Island. These use a multi-media approach and include face-to-face communication by QPWS staff (especially rangers), brochures, web pages, extensive signage, a DVD, use of mass media, and audio announcements. Most education products target all Island visitors, while some are directed at particular audiences such as fishers, residents, and backpackers. Activities such as formal presentations and informal liaison tend to be directed at non-visitor audiences e.g. commercial tour operators, special interest groups and residents. Seasonal education 'campaigns' are run to ensure more detailed and widespread delivery of education at times of the year when risks of attacks by dingoes are highest, given limited resources for education.

Many additions and updates have been made to education products since 2003, in order to implement recommendations of the 2003 and 2009 education strategy reviews (Environmetrics 2003, 2009). The extent to which these have been implemented is covered in Section 3.13.

Further examination of education products (Appendix 12) revealed the following potential areas for expansion in delivery of dingo-related education, to ensure that audiences are more comprehensively reached:

- The following audience groups do not automatically receive any pre-visit information before departing for Fraser Island: visitors who book online or by phone, independently travelling walk-on day visitors, and visitors on commercial tours other than tag-along tours. Receiving information well prior to their visit increases the chance that people will be aware of dingo-related information when they arrive, and helps ensure they are prepared (e.g. bringing suitable straps for securing eskies). Visitors who book online or by phone could all be reached by ensuring that they are automatically posted or emailed essential safety information as soon as they book. Walk-on day visitors are currently being targeted by requesting barge operators to distribute 'Some dingoes are dangerous' flyers to them, which seems an appropriate option, though there is no monitoring to ascertain to what extent this occurs. Commercial tour operators are discussed further below.
- Greater use could potentially be made of the barges and/or barge departure areas for providing dingo-related (and other) safety information, at least during peak visit times. The vast majority of members of the public travelling to the Island do so by barge, and while in transit they are a 'captive audience' with time available for receiving educational messages. Pre-departure options are to install interpretive panels and/or to provide educational staff (QPWS rangers or by outsourcing to a tour operator) at the departure kiosks for face-to-face contact. On barge options are: (i) handing or offering 'Some dingoes

are dangerous' flyers to all passengers, regardless of, or instead of, including them in permit packs; (ii) an educational briefing (by a ranger or outsourced to a tour operator) to all passengers, which would require provision of a quality audio system; (iii) provision of a plug-in audio system (similar to that available on airlines); (iv) directing passengers to a Smartphone Application (See section on 'investigation of social media opportunities' below); (v) presentation of a DVD, although previous investigations by QPWS have indicated that the current design of barges is poorly suited to visual presentations. Loud background noises (especially from the engine) are an additional problem with both the last two options.

- Education targeting international visitors is limited to a DVD provided to certain commercial tour operators, and pictograms on signs. The number of international visitors reached could be increased by producing a simple flyer in multiple languages, including the appropriate flyer in permit packs, and distributing a suitable mix to commercial tour operators.
- Formal education of commercial tour operators and guides (other than those involved in tag-along tours) and visitor information centre staff has been lacking since 2007, due to logistic difficulties in assembling a sufficient number of these people at the same time, and the costs involved. This could be best addressed by development of electronic information and/or training for new tour guides, disseminated by DVD and/or online. Linking this to incentives or making it compulsory should increase usage (see below).
- The detailed 'Dingoes of Fraser Island – safety and information guide' currently has a limited distribution due to cost saving. There is potential for much wider dissemination of education messages using more delivery outlets for this (or a similar) brochure. There may also be opportunities for wider dissemination of the 'Some dingoes are dangerous' flyer, especially by providing copies to all campers who say they have not yet seen one at camper briefings provided by rangers.
- There may be opportunities for more widespread dissemination and promotion of the 'Great Sandy National Park' DVD (or other DVDs), such as through accommodation providers, on barges, and to tour groups.
- There may be opportunities for more widespread and effective delivery of dingo-related education by third parties (especially commercial tour operators, accommodation providers, barge operators, visitor centres). It is not possible to objectively determine to what extent this is currently done, and a future review should investigate this further. However, QPWS staff believe that some tour operators may not be communicating dingo safety information to their guests to the extent that is desirable (see Appendix 13 for QPWS staff responses) Further building of co-operative working relationships between QPWS and these third parties, especially tour operators, is important to help encourage and informally monitor educational delivery by these parties. This should be a two-way process, in which QPWS also provide support to operators that helps improve the quality of their tourist products. Effective co-operation would also provide important additional support for the FIDMS such as through input into dingo monitoring. Quality of dingo-related education by tour operators could be further enhanced by (i) a process for QPWS endorsement of tour guides, or some form of accreditation or certification, in such a way as to provide benefits for both QPWS and tour operators; (ii) adding provision of dingo-related education as a requirement within commercial agreements/permits for tour operators, as is already the case for all tag-along tour operators.
- There may be opportunities for more effective delivery of dingo-related education to residents, although considerable effort is already being put into this. QPWS staff suggested that the level of community engagement should be further increased to better target residents (Appendix 13). Again, this needs to be a two-way process in which QPWS listens to

and learns from information and perspectives of residents, who often have detailed local and valuable local knowledge.

According to QPWS staff, the recommendations and guidelines presented in Environmetrics (2004) and Environmetrics (2009) have been used as a basis for developing education products and activities. A brief examination of existing education products and activities in relation to the above recommendations and guidelines confirmed that for the most part these have been implemented. However, the following suggested opportunities have not been adopted, or only partially so, and should be further considered:

- Install staffed interpretation centres or mobile interpretive displays near barge departure points on the mainland.
- Develop interpretation panels at Central Station that facilitate group education sessions by tour leaders.
- Facilitate professional development for commercial tourism operators and guides.
- Encourage tourism industry cooperation to develop a code of practice to foster cooperation regarding dingo-safe education.

Design quality of all recent dingo education materials is of a high standard. Most materials, with the exception of most of the signs at Central Station day use area, are in good condition or are due to be replaced by June 2014, according to an internal audit conducted in 2010/2011 by QPWS public contact rangers. This assessment is supported by copies of the signs provided to the review team. A sign renewal program is in process which provides for progressive updating of all signs.

Review of educational messages

No detailed listing of educational messages that are presented in the various education products was available, and compiling these was beyond the scope of this report. Maintaining a comprehensive and up-to-date list of intended messages would facilitate internal planning and evaluation, as well as future external evaluations. These messages could be coded and linked to individual education products listed in a spreadsheet of education products and activities such as that in Appendix 12.

A wide range of dingo-related messages is delivered through Fraser Island education products. Most of these products focus on the central messages of being aware and alert to the potential danger of dingoes, how to keep children safe, not feeding dingoes and safeguarding food and how to otherwise behave safely around dingoes. Messages regarding existence of large penalties for feeding dingoes, identification of individual dingoes and basic natural history of dingoes are also widely disseminated. More complex messages, covering dingo ecology, dingo management and associated rationale, and myths vs realities, are limited mainly to the website and the 'Dingoes of Fraser Island – safety and information guide' brochure, and are beginning to feature in new signage.

Messages incorporated in education products are generally consistent with those recommended in planning documents (as summarised in Appendix 14). Additional messages recommended by Environmetrics (2004) have only recently been added, and should continue to be progressively incorporated in new education products.

However messages about how people should behave if a dingo approaches them or appears in their vicinity do not consistently accord with recommendations in planning documents. There is a

need to determine the most appropriate message for this situation and to communicate this consistently (see below).

A brief examination of messages included in education products and recommended in planning documents indicated that most are appropriate and consistent with existing knowledge about dingoes and international experience of interactions with potentially dangerous wildlife. Current plans to increase communication of messages relating to dingo ecology, dingo management and its rationale, and to address potential misinformation about dingoes and their management seem appropriate in order to foster increased understanding and support for QPWS management practices.

However, there is a lack of scientific evidence to directly support the following messages relating to human-dingo interactions (Section 3.9). Given the potential importance of human behaviour in influencing dingo aggression, there is a need for a more thorough and objective assessment of the evidence-base for these messages, and for research into key gaps which include:

- the provision of food to dingoes by people leads to aggression of dingoes towards people: there is a need for a more accurate and complete articulation of this relationship
- certain dingo behaviour towards people is 'dominance testing' (e.g. on QPWS website).
- how people should behave if a dingo approaches them or appears in their vicinity.

In addition, there is a need to further consider the following issues regarding the appropriateness and adequacy of messages (based on scientific evidence and/or potentially valid claims made by stakeholders):

- Whether the message about the existence of large fines for feeding dingoes (including through inadequate food security) could be more prominently or effectively promoted, including through inclusion in all camper briefings. The Visitor Survey 2012 found that even post visit, more than 20% of visitors said they were not aware of the existence of such fines. This is despite such messages being included in most education products. The existence of penalties can be an important behavioural motivator for many people.
- Whether the appropriate balance between fear and respect/appreciation for dingoes is created by existing dingo education products. This could be done through one or more additional questions in a future visitor survey and consideration of international best practice. Some stakeholders have suggested that the 'fear' message may be overly strong in existing materials.
- Expanding or further clarifying messages about the ages of children who are vulnerable to attack by dingoes (see Appendix 13 and 'feedback from park users' below). Improvement in incident reporting and analysis would allow for objective information to clarify the relationship between a person's age and relative likelihood of Code D and E incidents.
- Whether messages about how to deal with rubbish could be more effectively and comprehensively communicated (Appendix 13).
- Whether there is a need for additional use of messages that promote appreciation of the dingo as a wild native animal, with a role in the ecological community (Appendix 13 QPWS staff interview responses).
- Further development of messages that encourage people to take more personal responsibility for their own safety, and to highlight the broader context of risks other than dingoes.

- Adding emphasis to existing messages to convey that all visitors are at potential risk, to help overcome any beliefs that 'it won't happen to me' (Appendix 13).
- Adding further explanation to messages advising visitors to report dingo incidents (Appendix 13). This could include explaining that incident reporting may help ensure safety of other visitors. The QPWS claim that increased incident reporting may allow early intervention and thus save a dingoes life should be further investigated, and if proved valid, incorporated into messages.

QPWS interviews

Responses to QPWS staff interviews regarding the effectiveness of public education and community engagement activities are detailed in Appendix 13. Staff believed that education was effective in influencing the majority of visitors to behave appropriately in relation to dingoes. However they identified significant gaps in compliance, and some potential solutions. Education was seen as much more important than enforcement in contributing to visitor compliance with dingo safety objectives. Several additions and modifications to objectives of the FIDMS and education messages specified in the Communication Plan 2004 were suggested. They identified tag-along tour groups as a supplementary audience group that was not specified in the 2003 education review - these have largely replaced independently travelling backpackers.

Techniques and distribution for disseminating educational messages were considered by QPWS staff as generally appropriate, with several additions or changes suggested.

The main obstacles to effective communication identified by QPWS were (in no particular order of priority):

- Beliefs and attitudes held by some members of the public in relation to dingoes and their management which are not aligned with the FIDMS e.g. dingoes need to be fed, dingoes are like dogs.
- Some tour operators not adequately communicating dingo education messages to their guests.
- Apathy of some visitors regarding: dangers of dingoes, failure to take responsibility for their own safety, and not perceiving dingoes to be of conservation value.
- Insufficient staff resources for face-to-face contact with a substantial (but unknown) proportion of visitors, especially during peak visitor times.
- Lack of QPWS ability to respond in a timely fashion to information in social media regarding management of Fraser Island dingoes which is not aligned with the FIDMS, due to current departmental media policy.
- Major diversion of staff time away from normal duties, including effective face-to-face education, into responding to Ministerials and Right to Information (RTI) requests, away from other duties including effective face-to-face education.
- The impact of vocal opposition to QPWS dingo management on rangers.
- Uncertainty regarding continued production of visitor brochures containing dingo safety messages.

Some solutions to help overcome these obstacles were suggested by interviewees (see Appendix 13).

Feedback from park users

A summary of the Fraser Island Visitor Survey 2012 (including tour operator survey) is given in Appendix 15. Key findings included:

- There is a high level of readership of Fraser Island dingo information, particularly information centre signage and brochures, but including a wide range of other sources (visitors were not asked about their preferred methods of receiving information). However, there are some significant gaps in visitors receiving Fraser Island dingo information, with 29% of respondents saying they had received no information. These include members of tour groups and people booking online. Tour operators believed that a more visible ranger presence is needed on the Island.
- Most visitors value the advice they receive about dingoes.
- Many visitors demonstrate knowledge of key dingo education messages, and this increases during their visit. However, both pre and post visit, more than 20% of visitors were not aware that there are large fines for feeding dingoes or leaving food or rubbish lying around, or that some campsites have food lockers for securing food. Less than 30% of visitors believed that 'the dingoes of Fraser Island are becoming extinct' was false. More than 20% of visitors believed the following statements, even post-visit:
 - 'Walking alone on or near the beach is not a risk for adults.'
 - 'Dingoes that look thin are likely to be very hungry.'
 - 'Parents should keep small children close, but older children are safe by themselves' (but see below regarding wording of this question).
- Reporting by tour operators and visitors suggests that most visitors are receptive to messages about behaving safely around dingoes, and follow guidelines.

The provision for regular visitor surveys in the FIDMS continues to facilitate important objective feedback on implied intermediate outcomes of the education strategy relating to visitor beliefs, knowledge and attitudes. The majority of questions in the 2012 visitor survey are appropriate for future use. The following statements in the survey should be reworded, while others should be maintained to facilitate comparison over time.

- 'Parents should keep small children close, but older children are safe by themselves' – due to ambiguity of interpretation, this 'two part' question should be split into two statements, each relating to and specifying a different age groups (perhaps 'up to 9 years old' and '10 to 15 years old').
- 'Dingoes are very dangerous' should be reworded to be more knowledge-based rather than subjective and emotional, e.g. to 'dingoes can kill or seriously injure people'.
- 'Dingoes that look thin are likely to be very hungry'. As the true answer to this question is difficult to ascertain, this statement should be removed or reworded to e.g. 'Dingoes that look thin are suffering' or 'It is natural for some dingoes to look thin'.

Analysis of responses to the online survey, and relevance to the education strategy, are discussed in Section 3.5.

Investigation of social media opportunities

All QPWS staff interviewed (see Appendix 13) believed that widespread dissemination of dingo messages through social media that are contrary to those promoted by QPWS has significantly reduced the effectiveness of QPWS dingo education efforts, and has negatively influenced public support for QPWS management of dingoes. They perceived that this was exacerbated by their current inability to provide input into these media particularly by responding when they perceive incorrect information has been disseminated. Actions relating to input into social media have been included in the draft Community Engagement Plan. Regional and island based staff believed that input must be timely and will be most effective if done at the regional level.

QPWS staff on Fraser Island have recently commenced regular monitoring of social media channels regarding communications about Fraser Island dingoes. The opportunity for regional staff to contribute to social media is not currently endorsed, pending department-wide development of policies on use of social media.

NPRSR is tasked through its Strategic Plan to contribute to further development of sustainable tourism in protected areas. In October 2012, a new unit (Events and Visitor Attraction unit) was established in NPRSR, whose role includes marketing and community engagement in relation to protected areas. This will include use of social media, other internet options and new communications technology. The new focus on social media reflects a Queensland government policy and LNP election commitment to improve tourism development and marketing through (among other means) focusing on developing social media networks. Staff time and other resources may be allocated to an ongoing social media presence at State level, although this would require additional funding and up skilling of staff. The Unit is expected to explore the possibility of delegation for input into social media by QPWS regional staff according to specified guidelines. It will also explore improvements to QPWS websites to allow for more interactive use, further development of the QPWS Facebook page, and development of Smartphone Applications for visitors to some protected areas. Such Applications could include dissemination of key safety messages, and the use of multiple languages.

Griffith University professor with expertise in new communication technology, Professor Stephen Stockwell (Stockwell 2012, pers. comm. 15 Nov) stated that Australian government departments are embracing social media in a very constructive fashion and are seeking best practice as the ruling standard. Experience from the Brisbane floods, and particularly the police response, have provided many useful lessons for the application of social media in crisis situations (Cheong & Cheong 2011, Burns et al. 2012, Bird et al. 2012, Queensland Police Service, 2011). Stockwell suggested that with respect to Fraser Island dingo management, there be a social media specialist in the central communications office whose duties include monitoring general media and social media posts, and intervening via social media to clarify the facts and share the Departmental position in brief and persuasive fashion. Timely responses are important for effectiveness and should occur within 24 hours. Stockwell believes that in cases where potential misinformation is being promoted via social media, ongoing monitoring of and input into these media are of critical importance for government. Developing standardised lists of responses is likely to be appropriate to deal with the need for political approval and to reduce time investment. Media officers should take every opportunity to provide links to appropriate QPWS web pages as part of their posts. However Stockwell recommended that in building agency

expertise, techniques for use of social media should be tested on non-controversial issues before expanding to dealing with more politically sensitive issues.

Among respondents to the 2012 visitor survey, 7% (when asked on departure from the Island) and 11% (when asked on arrival) identified social media as their main source of information about Fraser Island dingoes prior to their visit. Among respondents to the online survey (Section 3.5.2), 36% identified social media as being one of their top three preferred methods for receiving information relating to Fraser Island dingoes. Considering only those who identified themselves as recreational visitors to the Island within the last five years, this figure was 31%. A question regarding preferred methods for receiving information should be included in the next Fraser Island dingo visitor survey, including determining which social media networks are preferred.

Comparisons with 2003 education review

The only methods that are directly comparable between the 2003 and present review are those for the visitor surveys conducted in 2003 and 2012. Regarding knowledge questions, there were four questions for which the number of 'correct' responses had increased and six for which knowledge had decreased. Most differences were of a magnitude of less than 10%, which given the small sample sizes (particularly of the 2003 survey), may not be meaningful. There was a larger decrease in the percentage of respondents stating agreement with the statements that 'dingoes are much like pet dogs' and 'dingoes can open iceboxes'. Overall, these results suggest that there has been little change in knowledge relating to education messages between 2003 and 2012. Descriptions of audience groups and recommendations on education media and techniques provided by Environmetrics (2003) remain potentially relevant. However these need to be updated by providing adequate resources for required research in the next review of the FIDMS.

The 2003 review and the present review both concluded that the design and distribution of materials and activities are largely appropriate. Both reviews identified a number of areas for potential improvement in order to improve effectiveness. Many of the issues identified in the 2003 review have since been addressed and overcome (e.g. education targeting compliance issues with particular audience groups). Other issues remain problematic (e.g. resources being inadequate to allow public contact by rangers with a substantial proportion of visitors), and new challenges have arisen (e.g. the role of social media in spreading information contrary to QPWS educational messages). Overall, while it is not possible to quantitatively compare the effectiveness of the education strategy between 2003 and 2012, it seems that there has been little change in effectiveness in relation to influencing Fraser Island visitors overall, while there is some evidence of increased effectiveness in influencing certain groups (fishers and residents).

Conclusions on effectiveness of the education strategy

Visitor survey data, tour operator feedback and results of the online survey (Section 3.5) provide evidence that implied intermediate objectives of the education strategy (relating to exposure to information; beliefs, knowledge, and attitudes) have to a large extent been effective. Feedback from QPWS staff and tour operators provides further anecdotal evidence that education has to a large extent been effective in also influencing behaviour. The design and distribution of materials and activities appears to be largely appropriate although a number of areas for potential

improvement in order to further improve effectiveness have been identified.

However available data do not provide for objective evaluation of the role of education in contributing to either visitor behaviour or number/severity of dingo incidents, and thus do not provide information to ensure that education is designed and delivered in the most effective and efficient way. Simple standardised indicators of visitor behaviour (linked to education objectives) should be developed that can be readily collected by rangers as part of their campground briefings, such as: rate at which campers leave food unsecured, rate at which campers leave litter out inappropriately, number of children of younger and older age groups not accompanied by an adult, number of adults walking alone along the beach during patrols. Similarly, as detailed in Section 3.11, collection of incident data should be better systematised and standardised. Research by external parties should be encouraged that adopts an experimental approach to implementing different educational actions (e.g. style of ranger briefings) and determining impact on visitor knowledge and behaviour; and determines the relationships between visitor knowledge and behaviour.

3.7 Enforcement

Review of QPWS documentation

The FIDMS does not include any outcome-related objectives relating specifically to enforcement, nor a clearly articulated strategy for its use (in conjunction with education). A brief up-to-date review of best practice in relation to effective enforcement in the context of protected area management and interactions of people with dangerous wildlife would help provide useful context for such a strategy. Relevant state-wide policies to foster visitor compliance would provide useful additional context. The potential deterrent value of enforcement in influencing visitor behaviour should be articulated and emphasised (as opposed to the immediate effects on people who are prosecuted).

Four actions relating to enforcement are included in the FIDMS (Section 3.13.2). It appears that two important actions have not been achieved: increasing enforcement effort, and monitoring and recording of non-compliance.

The Great Sandy Region Compliance Plan 2012-2013 (QPWS 2012) includes guidelines for ensuring compliance in relation to Fraser Island dingoes. Compliance with appropriate dingo-related behaviour (dingo feeding and interactions, food security and consumption of food in prohibited areas, camping regulations including disposal of human waste) is specified as of high priority. Key periods for addressing compliance are identified as all year with focus on mating and whelping and high visitor periods. The Plan includes key actions relating to education, enforcement and monitoring/reporting. Enforcement actions specified are issuing of infringement notices, with the possibility of eviction for non-compliance with camping regulations, and scheduled presence of rangers with educational materials. Specific enforcement practices relating to commercial tour operators are also listed (daily monitoring for breaches and issuing of warning letters and PINs, and targeted operations focusing on operations and administration breaches). Undated internal documents such as 'Communication and compliance strategy for delivery of be dingo alert messages on Fraser Island' and 'Dingo education/compliance and enforcement patrol strategy' spell out more detail on the effort that rangers should put into checking for compliance, and the

appropriate approach to enforcement at various sites and with various audience types. The latter document states the objective of the patrol strategy as being 'safety and duty of care to visitors in particular families with children, and long term conservation of Fraser Island Dingoes', and identifies limited human resources and time to implement as a key constraint. Development of a compliance strategy or plan which expands on the existing Compliance Plan may assist further in:

- ensuring that a strategic and efficient approach to enforcement is adopted
- providing staff with objective guidelines for conducting enforcement and balancing this with use of education (see concerns identified below under QPWS interviews)
- facilitating increased accountability (internal and external).

Commercial Activity Agreements recently developed for tag-along tour operators (QPWS 2010) include several enforceable requirements relating to dingo safety. The case study below indicates that there have been some problems with compliance with these requirements, although these seem to relate more to practical difficulties inherent to this form of tourist operation, rather than to operators actively failing to comply. Permits or agreements for other commercial tour operators vary between operators and only some of these incorporate dingo warnings or legal requirements. Rangers are aware of the permit/agreement arrangements and undertake regular patrols, and targeted compliance operations are sometimes conducted. Compliance checking of tour operators is overt rather than covert.

Case study – compliance of external parties

Compliance with legal obligations relating to dingoes by 'tag-along' tour operators and their clients was investigated as a case study. A tag-along tour is a relatively new form of commercial tour involving a group of clients each driving their own 4WD vehicle, and led by a driver-guide in another vehicle, who organises camping, meals and generally supervises the group. Several tag-along businesses operate on Fraser Island.



Tag-along tour operating on Fraser Island

Methods

General information on tag-along tours was obtained from QPWS, and Commercial Activity Agreements for tag-along tour operators were examined to identify legal requirements.

Dingo risk assessment data were examined to determine risk levels in geographical areas associated with tag-along tour campsites over the last two years. QPWS were also asked to provide any other available information on any association between tag-along campsites and dingo incidents or activity. Senior QPWS staff (three) and general duty rangers (four) were interviewed to identify perceived compliance-related concerns relating to tag-along tours, and suggest possible solutions.

Two general duty rangers were accompanied on briefings visits to two tag-along tour campsites. Ranger briefings and responses of visitors to these were observed at each of these sites. Campsites were observed for issues regarding food security, toileting and any other possible issues of concern regarding dingo-related behaviour of campers. Interviews were conducted with each of the driver-guides (without the ranger present). These questions were designed to obtain guide perceptions of compliance-related problems, contributing factors and potential solutions. However, insufficient time was available at each campsite for detailed observations or for interviews with clients, and briefings delivered by tag-along guides were not observed.

Results and discussion

Each tag-along tour group comprises up to four 4WD vehicles, led by a driver-guide. Tag-along tour campsites involve groups of up to 30 campers. Guests consist mainly of young backpackers, often from overseas. Since 2010 the majority of backpackers travelling to Fraser Island in 4WDs have done so as part of these tag-along tours, rather than by hiring vehicles independently (as previously occurred). Camping occurs mainly in unfenced campsites along the eastern beach, with each tour company tending to revisit certain designated areas on a frequent basis.

Tag-along tours are subject to Commercial Activity Agreements developed specifically for them (QPWS 2010). These include a number of enforceable requirements, including which camp sites are to be used, number of campers allowed at each site, providing a 'dingo-safe' briefing to all guests on establishment of each nightly camp, and that each tag-along tour group 'uses at least one portable camping toilet when camping in beach camping zones, to be emptied at QPWS portable camping toilet holding facilities'. The Agreements also specify that operators must at their own expense comply with all relevant legislation. By implication, this includes a requirement to adhere to legislation relating to food security and leaving human waste unburied. Compliance is checked by QPWS on an informal basis through onsite observations and discussion with driver-guides and clients.

Although the case study was intended to review compliance with legal obligations, no objective or quantifiable information was available on offences or penalties applying to tag-along tours. The information provided on compliance was all anecdotal and based on opinion.

QPWS staff reported a generally acceptable level of compliance with provision of dingo-safe education briefings. However they report that toileting is not occurring as specified in the Agreements, with toilet tissue and human waste often being observed by rangers within the surrounds of tag-along camps.

This is understood to relate to the practical difficulties faced by guides in cleaning toilets and travelling to the portable holding facilities during the evening. QPWS staff also believed that sites used by tag-along tour groups are problematic in attracting dingoes due to unavoidable inadvertent but regular provision of small amounts of food spilled while eating evening meals, and/or inadvertently leaving out rubbish that may attract dingoes.

This was not seen so much as a compliance issue, but rather as a practical difficulty associated with frequent use of the same campsites by large groups of campers, thus providing a small but predictable food source for dingoes. QPWS staff further reported that high levels of alcohol consumption that sometimes occur at these sites constitute an additional risk in terms of campers behaving in ways that make them vulnerable to dingo attack, particularly wandering off alone away from campsites.

The driver-guides interviewed indicated awareness and support for legal requirements relating to dingo safety. One said that he encourages male guests to urinate in the bush, asks everyone to 'hold on' as best they can with regard to defaecation, and offers to transport guests to a nearby township if they need to do so. He sees this arrangement as preferable to repeated emptying of the portable toilet at a site several kilometres away. The other said he tells guests that the portable toilet is only for defaecating. Both considered the current arrangements for toileting as specified by the Commercial Activity Agreements impractical and needing to be modified.

Campsites that contain tag-along campsites (One Tree Rocks beach camping area and Cornwalls Break-Poyungan Rocks beach camping area) were rated consistently at medium or high risk in QPWS risk assessments conducted between January 2011 and September 2012. This reflected in large part a relatively high rate of dingo incidents in these areas. Tables used by QPWS to compile risk assessments for January-March 2012, and April-June 2012 both contained detailed comments about Code C, D and E incidents that occurred during these times in these two areas, as well as a statement that 'dingo activity is high and consistent' throughout both these camp zones. QPWS identified another factor contributing to risk in these areas as being proximity to habituated dingoes from the Eurong township and resort area. QPWS staff provided anecdotal information on a particular group of juvenile dingoes born in Eurong and now frequenting the One Tree Rocks camping area, with associated Code C reports. Ranger observations indicate that this litter often visits these camping areas, especially when campers begin cooking.

QPWS management staff identified their preferred solution to these issues to be developing fenced camping areas for tag-along groups, and in the short term to improve toilet facilities so that bush toileting does not occur. Any move to fenced camping areas will need to consider concerns expressed by one driver-guide that the 'wild' and 'exclusive' appeal of their service will be diminished.

Both QPWS staff and driver-guides thought that as long as the current campsite arrangements remain, full-sized trailer mounted portable chemical toilets, with adequate provision for emptying by QPWS or a private contractor are needed. These would be stored at designated areas along the eastern beach for operators to pick up and transport to campsites when needed. The point of difference between QPWS and one operator was over responsibility for costs of purchasing, cleaning and maintaining these toilets.

Conclusion

Camping arrangements for tag-along tour groups appear to be contributing to increased risk of dingo incidents and therefore needs to be addressed. This appears due mainly to inherent practical problems with current arrangements rather than lack of compliance by operators, and an appropriate solution should involve a cooperative approach. The solution that would be most effective in reducing risks associated with dingoes seems to be provision of new fenced camping areas for tag-along groups, designed as far as possible to retain the 'wild appeal' and sense of each group having their own area. This has already commenced at K'gari campground. However, opposition to new fencing by some stakeholders would need to be fully considered, and concerns addressed as far as possible. In addition, short term workable arrangements to allow all guests to use larger sealed portable toilets are needed. The main obstacle currently preventing these actions from occurring appears to be lack of ability or willingness of either QPWS or tour operators to contribute to payment. Further negotiations are needed towards a co-operative solution. A small increase in the existing daily site fee payable for each guest by commercial tour operators could be one way of addressing this, although any such attempt is likely to lead to public resistance.

Issuing of penalties

Enforcement with regard to dingo-related offences occurs mainly through warnings (verbal or written), or through prosecutions by penalty infringement notices (PINs) or through the courts.

Between 1995 and 2001, 115 PINs were issued to people for feeding dingoes (Environmetrics 2003). The majority of these infringements were for inadequate food security rather than deliberate feeding; according to QPWS staff (numbers are no longer available). Several of these PINs were issued for infringements outside of the protected area estate (numbers are not available). From 2002 to early 2003, no PIN records are available.

From July 2003 to August 2012, 453 PINs were issued for dingo-related infringements. While many of these infringements in principle relate to native animals in general, QPWS staff advise that all of these cases were relevant to dingoes. According to records, all of these PINs were issued under the *Recreation Areas Management Act* (1988 and subsequently 2006) (RAM Act). Dingo-related PINs comprised 29% of all PINs issued. Only eight of these were for unauthorised (deliberate) feeding of dingoes, and the remainder involved failing to secure food (including litter or offal) from animals. From December 2004 to December 2011, 42 written warnings were issued for failing to secure food from animals. (During 2012, these have been replaced by Notices to Comply). These comprised 48% of all written warnings issued. Figure 20 shows that the number of dingo-related PINs issued since 2004 peaked in 2006 and has subsequently steeply declined (15 in 2011 compared with 98 in 2006). This decline parallels, but is less marked than, a decline in the number of PINs issued for all offences. A similar pattern is seen when numbers of PINs and warning notices are combined.

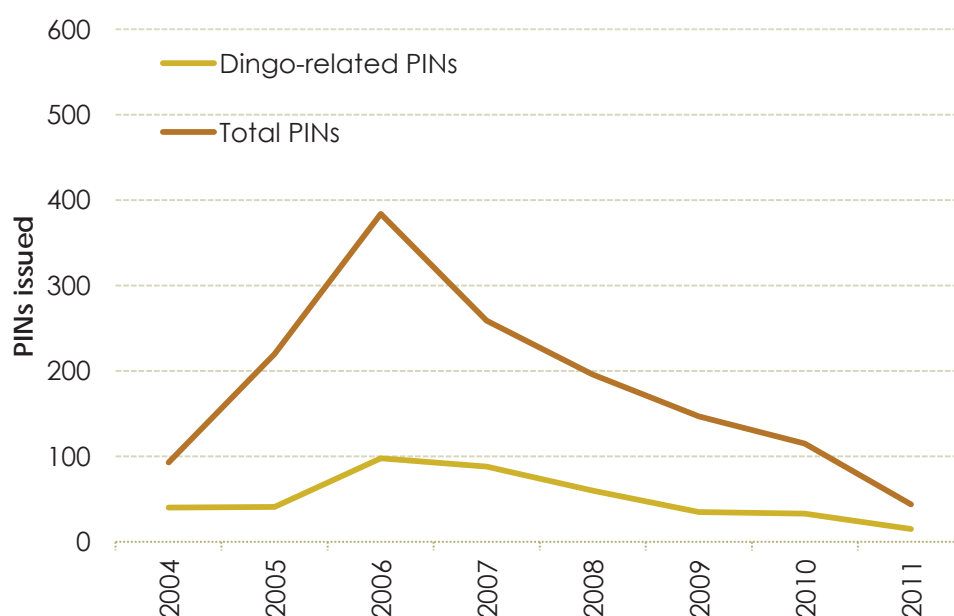


Figure 20 Annual number of PINs issued between 2004 and 2011

Possible reasons for the decline in number of PINs issued since 2006 are:

- visitors improving in their compliance with regard to securing of food from animals
- reduced time spent monitoring compliance at campsites by rangers
- reduced tendency of rangers to issue PINs.

Since August 2007, ten dingo-related infringements have been dealt with by court proceedings. The infringements related to: feeding dingoes, disturbing dingoes, interfering with dingoes, and/or leaving food unsecured at a campsite. In nine of these cases, a fine was issued, with the amount for a single offence ranging from \$500 to \$34,000, and a maximum of \$40,000 to a single offender for multiple offences. All of these fines were issued under the RAM Act (see Section 1.7). In one case, several concurrent jail sentences of nine months, suspended for three years were issued, under the *Nature Conservation Act 1992*.

Figure 21 shows a possible relationship between issuing of PINs and subsequent number of dingo incidents. The increased number of PINs issued in 2006 and 2007 was followed by a decrease in number of Code C incidents (although these were already decreasing), while the subsequent decreased number of PINs was followed by an increase in Code C, D and E incidents. A similar pattern was found when considering PINs and written warnings combined. However as discussed in Section 1.6, incident and PIN data cannot be corrected for visitor numbers or reporting effort (nor other more minor factors), and therefore it remains unclear whether there is a causal relationship.

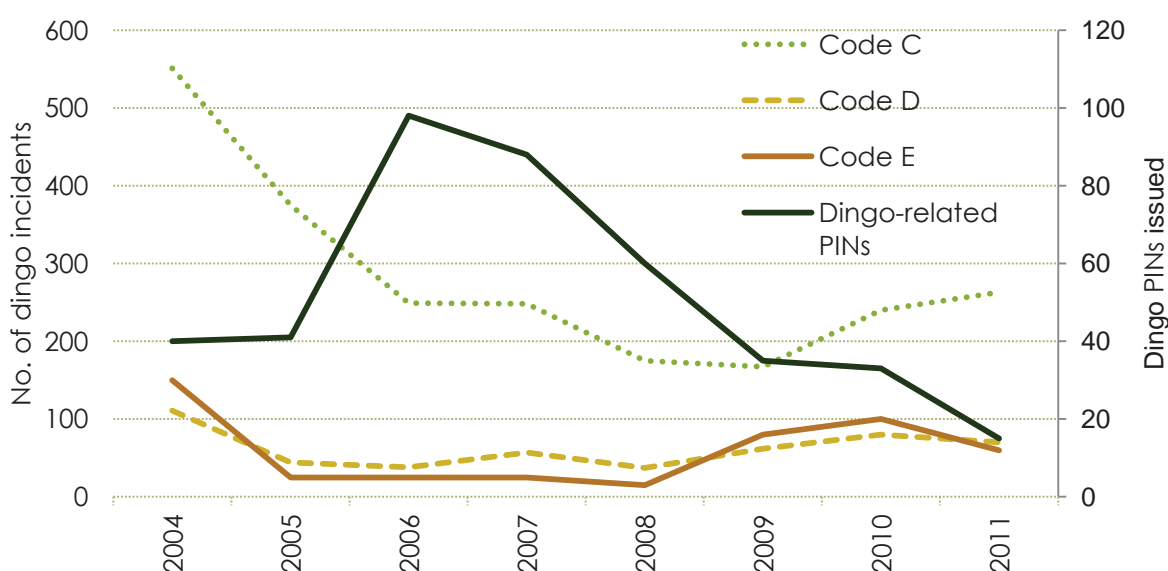


Figure 21 Annual number of dingo-related PINs issued and dingo incidents between 2004 and 2011

In the QPWS staff interviews (see below), rangers all expressed concern that a recent decrease in enforcement effort may have contributed to a decrease in public compliance with dingo-related legislation, leading to an increased risk of aggression by dingoes towards people. This underlines a possible need to develop a compliance strategy which maximises compliance outcomes and removes the need for rangers to make subjective decisions by providing objective guidelines.

QPWS interviews

Responses to QPWS staff interviews regarding the effectiveness of enforcement activities are detailed in Appendix 13. No changes were suggested by QPWS staff to the FIDMS specifically in relation to enforcement. In assessing effectiveness, rangers appeared to focus on the immediate effects of enforcement, rather than fully recognising the associated deterrent value (which is likely to be more important). Better articulation of the role of enforcement in the FIDMS or a compliance strategy may help address this.

Staff indicated that large fines imposed by courts, and an increase in the value of on-the-spot fines seem to have been effective in increasing the effectiveness of enforcement (as a strong deterrent). On the other hand, they expressed concern that high profile court fines had increased resentment towards QPWS by some parties.

The main obstacles to effective enforcement identified by QPWS staff were:

- lack of clear enforcement capability outside the protected area estate
- opposition to QPWS management of dingoes from some community sectors, making it more difficult to proceed with enforcement
- inadequate capacity of rangers to conduct enforcement with full effectiveness
- insufficient resources for public contact to allow detection of infringements by a large proportion of visitors, particularly during peak visitor times.

The following possible solutions to help overcome these obstacles were suggested:

- Collaborate with local council to develop by-laws to prohibit feeding of dingoes on council land.
- Continue to pursue fencing of campsites on the protected area estate.
- Address public opposition through input into social media, more input into traditional news media, more proactive community engagement and a variety of other means.
- Increase training of rangers in enforcement.
- Appoint enforcement professionals as opposed to use of rangers for enforcement.

A new senior compliance officer with expertise in enforcement has recently been appointed to help address staff capacity in this area, including through provision of training.

Conclusions on effectiveness of enforcement activities

Visitor survey data and tour operator feedback (Appendix 15) and the online survey (Section 3.5.2) provide evidence that most visitors are aware of legal requirements relating to dingoes and the existence of fines or how likely they believe prosecution for infringements to be, which may

warrant further investigation. It is not known whether they are also aware that rangers have powers to issue fines. Feedback from tour operators provides some anecdotal evidence that enforcement has contributed to influencing behaviour. On the other hand, QPWS staff reported their belief that current low levels of enforcement are resulting in low levels of effectiveness in relation to visitors in general. The main obstacle appears to be difficulties faced by rangers in issuing penalties. However available data do not provide for objective evaluation of the role of enforcement in contributing to either visitor behaviour or number/severity of dingo incidents. It is possible that a recent reduction in issuing of PINs may have contributed to an increase in dingo incidents, but this requires further investigation based on improved monitoring data.

While rangers are conducting their regular campsite visits, there appears to be an opportunity for them to collect standardised data on infringement type and frequency without significant additional time being needed. Indeed this is a recommended action within the FIDMS that has not yet been achieved (Section 3.13.2). Such monitoring would allow assessment of the effectiveness of management practices (education and enforcement) in influencing compliance, which would increase potential for appropriate adaptive management and facilitate efficient use of resources.

3.8 Engineering solutions

The key engineering solution that is currently being used to manage interactions between dingoes and people is their physical separation through fencing. This has largely replaced the need for other engineering solutions that were previously relied upon. However, at day use areas and camping grounds that remain unfenced, these solutions continue to be important in effectively managing risk, and encouraging natural dingo foraging behaviour. Such engineering measures comprise the following:

- BBQs and wash-up facilities – covered BBQ hot plates to prevent dingo access and designated wash-up areas with educational signage to discourage food scraps being left accessible.
- Food and gear lockers – lockable storage cages for food and gear to exclude dingoes and prevent inadvertent feeding and attraction.
- Lighting – solar powered lighting to discourage dingoes from entering campsites at night, and enable people to see an approaching dingo and behave appropriately.
- Toilets – improved facilities to limit bush toileting and associated dingo attraction to campsites.
- Fish cleaning stations – the provision of fish cleaning stations, along with areas where cleaning is prohibited, reduces dingo attraction to high use areas as well as the association between humans and food.

Analysis of incidents pre- and post-fencing is detailed in the case study below. Analysis to determine the effectiveness of other engineering solutions listed above was not possible because of the following:

- Facility improvements and installation of engineering solutions has been gradual and varied over time at and between locations e.g. improvement to lighting was not done at all

campgrounds at the same time, nor were all improvements made to one campground at the same time to allow analysis of combined effectiveness.

- Exact dates for such improvements were unavailable.

In summary, through MCDA evaluation (Section 3.3), all of these engineering solutions were found to appropriately contribute to achieving FIDMS objectives and should be continued as required. Of these, physical separation through fencing is expected to be the most effective at reducing risk to humans – see case study.

Case study – How effective is fencing at reducing human-dingo conflicts?

The use of fencing to exclude dingoes from high-use visitor areas is designed to reduce negative human-dingo interactions. Thus, fencing is expected to reduce the number of dingo incidents. However, fencing may not reduce the number of incidents where dangerous dingoes continue to be a problem outside fenced areas. If this were the case, incident rates at fenced areas may not change, but the location of incidents may be expected to change (as dangerous dingoes continue to be dangerous outside the fence only). These numerical and spatial components to evaluating the effectiveness of fencing were assessed separately in two stages.



Fence at Kingfisher Bay showing: spring-loaded pedestrian gate with signage; vehicle access; and solar panel for electric grid.

Methods

Stage 1 – Comparison of overall incident rates pre- and post-fencing

Study sites

Of the 11 fenced areas on Fraser Island, Dundabura, Dilli Village, Eurong, Happy Valley and Kingfisher Bay Resort were selected as 'treatment sites' because incident data for 12 months prior and subsequent to fencing were available, and the date of fence completion was known. Three other unfenced 'nil-treatment or experimental control' sites (Cornwell's, One Tree Rocks, and Eli Creek) were used for standardised comparisons with the treatment sites.

Experimental design

These data were analysed as four separate 'experiments', each with at least one treatment (or fenced area), and three nil-treatments (unfenced areas). Each experiment had two time periods (i.e. pre-fencing and post-fencing). Hence, Dilli Village, Dundabura, and Kingfisher Bay Resort were considered as separate experiments because their fences were completed at different times (i.e. March 2003, May 2004, and July 2005 respectively), while Eurong and Happy Valley were considered a part of the same experiment because they were fenced at the same time (October 2008). We compared the mean number of incidents per month for the 12 months prior to fencing with the mean number of incidents per month for the 12 months after fencing, excluding the month that the fence was completed (to avoid undue influence of the additional building works and associated visitors during primary fence construction). Limiting the period to 12 months was done to minimise potential long-term differences in visitor numbers, reporting rates, and seasonal fluctuations in dingo activity, while allowing incorporation of the same number of high-use times (e.g. Christmas and Easter holiday periods) in both pre- and post-fencing periods.

Analyses

Repeated measures ANOVAs were conducted to assess the effect of site (the fenced and unfenced areas), treatment (fenced or unfenced), time period (pre- or post-fencing) and their interactions, on incident rates. Using this approach, we expected to identify a significant reduction in incidents at fenced sites between pre- and post-fencing periods for each experiment, compared with unfenced sites which were not expected to show a significant reduction in incident rates.

Stage 2 – Comparison of incident locations inside and outside selected fenced areas

Study sites

From descriptions recorded with the incident reports collected we were able to identify the spatial location (categorised as 'inside' or 'outside' the fence) of incidents during the period of interest (i.e. 12 months prior to fencing and 12 months subsequent) for Eurong only (the single treatment site used in Stage 2 analyses). Cornwell's, One Tree Rocks, and Eli Creek were again used as control sites.

Experimental design

Changes in incident rates before and after fencing were compared for incidents recorded both inside and outside fenced areas at Eurong only, and compared these to changes in incident rates recorded at Cornwell's, One Tree Rocks, and Eli Creek as in Stage 1. This was done to assess the spatial component of incidents.

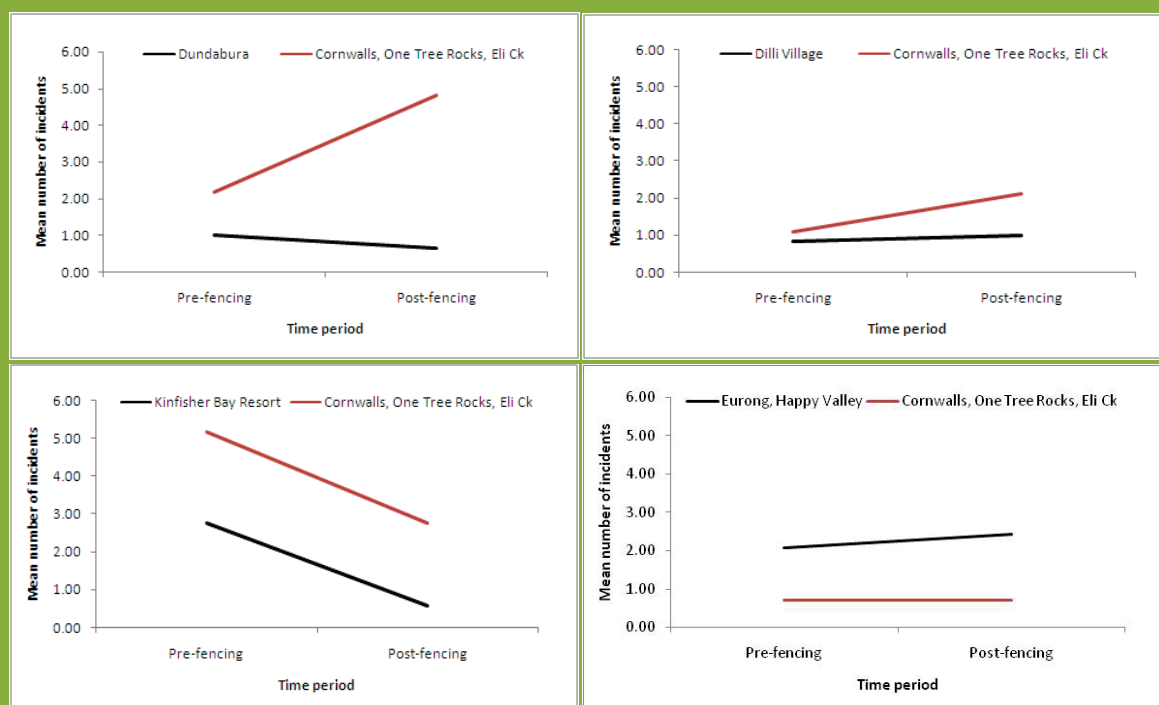
Analyses

Differences in the mean number of incidents pre- and post-fencing were compared using one-tailed t-tests because fencing was expected to reduce (not increase) incident rates inside the fence.

Results and discussion

Stage 1 - Comparison of overall incident rates pre- and post-fencing

There was no demonstrable effect of fences on overall incident rates at Dilli Village, Dundabura, Kingfisher Bay Resort, Eurong or Happy Valley, where no effect of treatment ($p = 0.34$ to 0.74 for each experiment), time ($p = 0.14$ to 0.75 for each experiment), or their interaction ($p = 0.26$ to 0.92 for each experiment) were detected (see figure below). This occurred for two primary reasons. First, sample sizes were very small and highly variable. In other words, a large number of incidents do not occur frequently enough at any site in order to detect statistically significant differences in incident rates. Secondly, this analysis does not account for the spatial location of incidents. For example, a certain number of incidents may have been recorded as occurring at 'Happy Valley' prior to fencing, and the same number of incidents may have been recorded as occurring at 'Happy Valley' after fencing; but without knowledge of where the incidents occurred, there is no way of identifying whether or not incidents occurring subsequent to fence construction occurred inside or outside the fence, necessitating an assessment of the spatial component of dingo incidents.



Changes in incident rates at fenced (black lines) and unfenced (red lines) sites, showing no demonstrable reduction in incident rates at fenced sites independent of reductions at unfenced sites.

Stage 2 - Comparison of incident locations inside and outside selected fenced areas

Likewise found fencing had no demonstratable effect on incident rates at Eurong, where there was no significant difference in the number of incidents inside the fence (compared with outside) after fencing (see table below). There was a demonstrable increase in the number of incidents outside the fence at Eurong, but mixed results from Cornwall's (where incident rates decreased), One Tree Rocks (where incident rates increased), and Eli Creek (where incident rates remained stable) imply that the increase at Eurong cannot be reliably attributed to the effect of the fence.

Results of analysis of incidents pre- and post-fencing at Eurong (with three control sites).

| Location | Pre | Post | t stat | df | p |
|----------------|------|------|---------|----|--------|
| Cornwalls | 1.25 | 0.25 | 2.3212 | 20 | 0.0155 |
| Eli Creek | 0.33 | 0.42 | -0.3093 | 22 | 0.3800 |
| One Tree Rocks | 0.58 | 1.50 | -1.5892 | 15 | 0.0664 |
| Eurong INSIDE | 1.50 | 1.00 | 1.1055 | 21 | 0.1407 |
| Eurong OUTSIDE | 2.00 | 3.58 | -1.6408 | 20 | 0.0582 |
| Eurong TOTAL | 3.50 | 4.58 | -0.9128 | 19 | 0.1864 |

Conclusion

While these data might be interpreted as a failure of the Eurong fence at reducing the number of incidents (either overall or within the fence), four important caveats require recognition:

1. Visitor numbers and reporting effort

Incident rates have not been adjusted for changes in visitor numbers or reporting effort. While methods attempted to minimise the effects of these, it was essentially assumed that they were constant, which is unlikely to be true. The degree to which results will be influenced by these two factors will depend on their variability, which is presently unknown. Hence, it is uncertain whether or not incident rates changed or not without these data, and the results presented above should therefore be interpreted with caution.

2. Fence integrity

There are ongoing reports of gates being intentionally left open (QPWS, pers. comm. Oct 7th 2012) which compromises the effectiveness of the fence at excluding dingoes. The current designs of the fences (and grids) are adequate to exclude dingoes, but if gates are left open the fences become largely redundant. Not only does this practice increase the potential for negative dingo-human interactions and forfeit fence investments, but it makes objectively evaluating the effectiveness of fences very difficult. Consideration should be given to additional engineering solutions which can eliminate the occurrence of open gates. A simple and cost effective option may be to install alarms to alert management or other visitors to a gate being open for greater than a specified time period.

3. Location descriptions

Limited information on the location of incidents was available in a useable format, which was a key constraint in evaluating the effectiveness of fences. Location data were available only for Eurong and were simply categorised as 'inside' or 'outside' based on detail-deficient descriptions of the locations where incidents occurred. This limitation can be overcome in the future simply by recording a GPS location with each incident, which must become part of standard data recording and reporting practices.

4. Seriousness of incidents

Perhaps most importantly, the seriousness of incidents should also be taken into account. Although the numerical and spatial results described might suggest that fences are not particularly effective at reducing incidents, or that their effectiveness cannot be properly evaluated due to a lack of necessary data, it is important to note that no serious (Code D or Code E) incidents have occurred inside any fenced area subsequent to fence completion. Regardless of the three aforementioned caveats, this suggests that fences have been effective at eliminating the more serious dingo incidents. However, the future potential for serious incidents to occur within fenced areas will remain so long as gates are left open.

In summary, evaluating the effectiveness of fencing was made difficult by a lack of data fundamental to quantifying and interpreting numerical and spatial changes in incident rates. That gates are still left open also compromises the effectiveness of fences at reducing human safety risk, and engineering solutions should be investigated to prevent this from occurring. Regardless, no serious incidents have occurred within any fenced area since those fences were completed. It therefore appears clear that fencing has been effective at eliminating serious incidents within fenced areas, but that the potential for serious incidents to occur within them remains as long as gates are still left open.

Although the effectiveness of fencing could not be quantified at this stage given the constraints detailed in the case study above, provided its utility is maintained fencing is inherently a highly effective measure to reduce risk to visitors. Through discouraging dingoes from high use visitor nodes, fencing will also help facilitate positive animal welfare outcomes and a sustainable population by reducing potential for negative human-dingo interaction and the need for direct management of dingoes.

Regular maintenance of current facilities should continue to be scheduled to ensure they are maintained in working condition. Fences, and associated vehicle access grids, are currently checked at least monthly to ensure minimal risk of breaches. Occasionally dingoes were recorded crossing the car access grids, although this is now minimised through regular removal of sand from under the grids, and improved grid design. Intentional compromising of the fence operation (i.e. damage or gates being propped open) continues to occasionally allow dingo access, which has resulted in some Code C incidents.

Fencing should also continue to be sympathetic to dingo habitat, and should not exclude dingoes from important natural resources. Reduced predation pressure by dingoes within fenced areas has reportedly (Island residents, pers. comm., Oct 2012) resulted in increased populations of some prey species within fenced areas (i.e. goannas, small mammals, snakes, etc.). This should be explored in further detail with the view to prevent the occurrence of future human-wildlife conflict.

QPWS are continually reviewing fence design, and are currently investigating options to allow dingoes to escape from fenced areas, but prevent access back in.

While there are many benefits of fencing, it is not preferred by all stakeholders. Concerns voiced by some sectors of the community and tourism industry include the reduced ability to freely move across the Island, loss of natural experience and aesthetics. QPWS should continue to work with relevant stakeholders from the planning stage of each fence to minimise these potential impacts.

3.9 Direct actions

3.9.1 Dingo destruction

Attraction-habituation-interaction-aggression model

The FIDMS (QPWS 2006) currently presents the following model of events leading to a dingo attacking a human:

Attraction → Habituation → Interaction → Aggression

It also states that habituation results from beneficial and/or regular and continuing contact. The FIDMS mentions factors that may contribute to aggression or its severity as:

- dingoes involving people in their feeding activities and behavioural development
- people responding to dingoes with behaviour that may further excite or encourage them, such as running, throwing objects, splashing water, waving arms
- walking alone or leaving children unattended.

All these messages are included in dingo educational material provided to visitors.

This model is an oversimplification of the situation, contains some inaccuracies, and may be misleading. This has contributed to scepticism by some stakeholders and weakens the effectiveness of educational messages. The following is a more complete explanation of the relationships involved, informed by theoretical understanding of animal behaviour and international peer-reviewed literature regarding wildlife aggression towards people (e.g. reviews in Green and Higginbottom 2001; Lawrance and Higginbottom 2002; Environmetrics 2003).

Habituation involves an animal learning to ignore a stimulus (e.g. person) originally seen as threatening through frequent exposure with neutral consequences (rather than positive consequences). For example, habituation may occur if people (or vehicles) frequently approach dingoes to progressively closer distances over time, such as to take photographs. However, on Fraser Island, the most common situation where dingoes would experience repeated close exposure to people would be when seeking food provided by them deliberately or inadvertently.

Frequent attraction by food that is associated with the presence of people can lead to an animal developing an 'attraction' response to people even in the absence of food, through classical conditioning. This is more likely to happen with individuals that are already at least partially habituated. Thus, an individual that is originally naturally wary of people may become attracted to people, or habituated then attracted. If the source of attraction (e.g. food) is subsequently withdrawn the individual may progress to a long-term habituation response.

In addition, if people (i.e. residents) regularly interact with pups in other ways that the pups find reinforcing (e.g. play), or provide other resources such as shelter, the attraction response may be strengthened.

Frequent attraction by food into proximity with people provides a situation where, in the absence of significant aversive experiences with people, habituation to people is likely to occur.

Even if an animal is only mildly habituated to people, it may be attracted by food into the vicinity of people (especially if strongly motivated by hunger or the need to feed pups) and encounter them at close distances.

Attempted 'interaction' by a person with a dingo in the model above (e.g. trying to pat or play) could either be perceived by the dingo as a threat (most likely) and possibly increase the chances of defensive aggression, or could be positively reinforcing (if the animal is already highly habituated, especially if young).

When an animal is habituated and/or attracted to the vicinity of people, the potential arises for aggression to occur; whereas this will rarely occur with wild animals that retain their natural wariness and distance from people.

This risk is greatly exacerbated by the high numbers of visitors to Fraser Island, leading to a potentially large number of human-dingo interactions and the likelihood that some visitors will behave in ways that increase the risk of aggression.

The majority of international examples of wild mammals attacking people are associated with the

animals frequently obtaining food provided deliberately or inadvertently by people, leading to an attraction response.

Interpretation of motivations for dingo aggression towards humans on Fraser Island (such as predation/scavenging, territorial defence, competition over food, dominance, dominance testing, play or fear) are controversial, and such motivators have not been adequately scientifically researched. The likelihood of aggression and its motivation can be expected to depend on the combined effect of a wide range of factors which vary between individuals (dingoes and people) and situations including:

- the person's characteristics and behaviour in terms of providing a possible trigger for a predatory response
- the individual dingo's tendency towards aggression, which may be affected by genetics, age, reproductive status, dominance status, and experience of what behaviour has 'worked' in the past to avert a threat from a person or obtain a resource (if aggression has worked in the past, it may be more likely to recur)
- the extent to which the animal feels threatened by the person, based on e.g. previous aversive experiences associated with people or the person's behaviour
- the opportunity to flee in order to avert a perceived threat (as opposed to feeling trapped)
- factors affecting the level of motivation of the dingo e.g. if seeking food, affected by hunger or need to feed pups.

There is scientific evidence that dingoes are more likely to behave aggressively when a person moves away from them, whereas remaining still and quiet with head and eyes lowered usually promotes a neutral or submissive response or retreat (Lawrance and Higginbottom 2003). Importantly, while acting aggressively towards a dingo most often causes them to flee, in a few cases this seems to exacerbate the risk of aggression. Extrapolations from domestic dogs with aggressive tendencies further supports the idea that using aggression in such cases can be dangerous – especially if the person is perceived by the animal as vulnerable. Thus advising people to actively discourage dingoes could increase the risk that they will be attacked.

Research on cougars and coyotes suggests that if attacked, people are more likely to survive if they defend themselves aggressively (Environmetrics 2003), and this has been included in dingo education messages. However there is no scientific evidence as to whether this is the case for dingoes.

Other QPWS education messages regarding appropriate behaviour to minimise the risk of being attacked or injured appear to be based on anecdotal experience by rangers. While these may well be correct, there is a need to establish these factors scientifically, particularly in the light of opposition by some members of the public.

The potential for some individual dingoes that have frequent or highly aversive experiences with humans (related to hazing, capture or handling by QPWS; or aggressive deterrent techniques by the public such as throwing stones) to increase their likelihood of future aggression also needs to be carefully considered. In domestic dogs, repeated punishment from people can lead to fear-based aggression by some individuals (e.g. Horwitz and Neilson 2007). If the aversive measures are sufficiently intense or frequent to cause dingoes to subsequently avoid people in general, they

may be justified. But if not, they may be compounding the problem, and should only be used if a person is under attack as an immediate safety measure. Veterinary sedatives that are believed to facilitate retrograde amnesia may be advisable whenever dingoes are trapped and handled. Further advice on this should be sought from an appropriate specialist veterinary behaviourist.

The dingo incident records provide an unmet opportunity for further exploration of these factors (as recommended by Lawrance and Higginbottom 2003, but not implemented). PhD research by Rob Appleby at Griffith University is expected to provide further light on some of these factors.

Examination of the 35 dingo management histories provided shows that:

- the most serious incidents (Code E) are always accompanied by records of habituation and nuisance behaviour (i.e. Code C incidents)
- some individuals with multiple Code C incident records have no later records of involvement in dangerous incidents (Code D or E).

This suggests that while habituation does not always lead to aggressive behaviour, dangerous behaviour is always associated with habituation. For example, an incident may result from a habituated dingo viewing humans as competitors, prey, part of the pack hierarchy, or a direct threat to themselves or other dingoes within their pack.

In summary, it can reasonably be concluded that deliberate or inadvertent feeding of dingoes by humans greatly increases the likelihood that certain individual dingoes, in certain situations, will attack people. This is not a simple causal relationship, and a large number of poorly understood factors are likely to contribute to the risk of aggression. Hence, education messages should be reformulated to be consistent with this more complex picture, while remaining sufficiently short and simple. Given deficiencies in the existing knowledge base and difficulty of communicating complex messages to the public, management efforts, including education, should continue to focus on avoiding feeding of dingoes.

Meanwhile, further research to better understand factors influencing the likelihood of aggression are important to inform education messages and to determine appropriate management of individual dingoes.

Incident reporting system

Incident reporting categories can be found in Appendix 16.

The main criticisms of the current incident reporting system by some stakeholder groups are that:

- play behaviour may result in a Code D incident being recorded
- loitering results in a Code C incident being reported.

While play behaviour can be considered lower risk than aggressive behaviour, it must be recognised that a potentially dangerous animal 'playing' with people is not appropriate. Play can escalate into aggression, and the expression of play behaviour alone can cause risk of injury, particularly to young children. Playing with a person also may suggest that the dingo views humans as part of the dingo hierarchy, which may increase the risk of dangerous interactions

associated with dominance or competition.

It is important that QPWS staff have a thorough understanding of dingo behaviour to ensure consistency in reporting, and in order to best manage dingoes involved. For example, if appropriate aversive conditioning techniques can be identified and effectively implemented, dingoes attempting to engage in play behaviour with people should be managed to regain wariness of humans rather than destroyed.

Visitors should also understand basic dingo behaviour in order to react appropriately to different situations. It is recommended that simple information on dingo behaviour, and the appropriate way to react, be included within educational material.

Analysis of the humane destruction records and individual dingo management histories showed that since the significant culling event in 2001, all non-sick/injured dingoes destroyed had been involved in at least one (usually multiple) Code D and/or Code E incidents. There is no record of any dingo being destroyed solely for the accumulation of Code C incidents since the cull in 2001. The decision to destroy a dingo should continue to be on the basis of accrued Code D and E incidents, and no individual should be destroyed solely for Code C behaviour. Longitudinal data should be maintained in a way that allows efficient analysis of dingo histories to detect escalation to more serious incidents, or conversely, a decline in incident type or frequency. This will assist determining the potential cause of incidents, and evaluation of the effectiveness of management actions.

Code A and B 'incidents' are currently only recorded in hard copy and are not transferred into electronic databases, but are available for QPWS reference as required. As part of a holistic monitoring program and to inform population studies, these should be added to a spatial database. It is also recommended that Code A and B 'incidents' be renamed to 'sightings' to accurately reflect these records.

Procedures

The destruction of individual dingoes is undertaken for dingoes that have been deemed to present unacceptable risk to human safety (QPWS 2006). In some cases, dingoes that have become sick or injured are also humanely destroyed.

Euthanasia occurs through the use of (1) firearms or by (2) trapping and sedation followed by barbiturate overdose. These are both standard methods of euthanasia (ANZCCART 2001), and have been developed in conjunction with welfare experts, and approved by an animal ethics committee. QPWS euthanasia procedures were reviewed, and sedation is always used prior to intracardiac injection. Only suitably experienced, trained and authorised QPWS staff euthanase dingoes, with all requiring either a firearms licence or authorisation by the Chief Executive of Queensland Health under the Health (Drugs and Poisons) Regulation 1996.

Destructions

The humane destruction database shows that 135 dingoes have been destroyed since 1992 (Figure 22), including nine sick or injured dingoes. Sick or injured dingoes that were humanely destroyed have been excluded from further analysis, unless otherwise mentioned.

The highest number of dingoes destroyed in any given year was in 2001, when 32 dingoes were destroyed. 28 of these dingoes were destroyed over six days in April and May in response to the death of Clinton Gage.

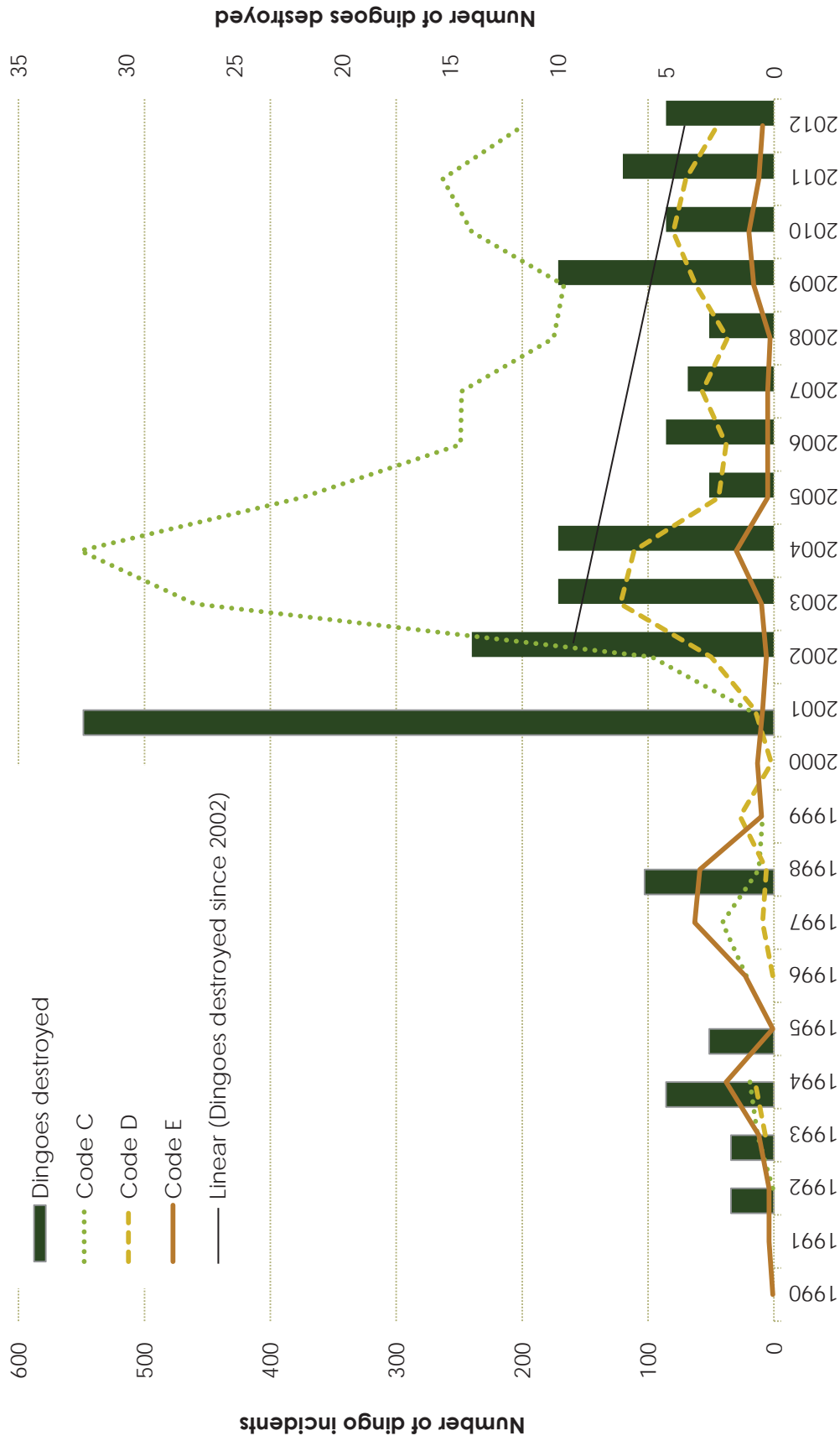


Figure 22 Trends in the total number of dingoes destroyed and incidents reported between January 1990 and October 2012. Code C incidents include loitering or stealing food, Code D incidents include overt aggression towards humans, and Code E incidents include serious attack. A linear trendline on the number of dingoes destroyed since 2002 is included to show the apparent declining trend in destructions since this time.

There was no demonstrable relationship between the number of Code D and E incidents and the number of dingoes destroyed 1990–2012 (df 22, $R^2=0.0788$, $p=0.1945$), or 2002–2012 (df 10, $R^2=0.2037$, $p=0.1635$), suggesting that not all dingoes involved in Code D or E incidents are destroyed, or that dingo destructions fluctuate independent of Code D and E incidents. Moreover, analyses of the camper data indicate the number of incidents per 1000 camper-nights has not significantly changed between 2007 and 2011 ($t = -0.4201$, df 11, $p = 0.3413$; Figure 3 in Section 1.6), suggesting that incident rates remain relatively stable under the current FIDMS. However, there appears to be a trend of fewer destructions since 2002 (Figure 22).

Since the current FIDMS commenced in November 2006, 58.8% (20 of 34) of the dingoes destroyed were known to have been illegally or inadvertently fed, and many others exhibited behaviour indicative of regular access to human foods (QPWS, unpublished data). This suggests that if intentional and inadvertent feeding can be eliminated, the number of dingoes requiring destruction may be reduced.

Analysis of the destruction records also showed that dingoes were not destroyed at random locations around the Island, but were instead removed from a relatively small number of high-use visitor areas only (Table 3). This suggests that dingoes from only a limited area of the Island are engaged in Code D or E incidents and subsequently exposed to the effects of humane destruction activities.

Table 3 The general area and total number of dingoes destroyed on Fraser Island between January 2002 and October 2012 (excluding eight sick or injured dingoes also humanely destroyed).

| General Area | N |
|--------------------|-----------|
| Central Lakes | 7 |
| Dilli Eurong | 24 |
| Dundubara | 1 |
| Eli Cathedral | 7 |
| Happy Valley | 7 |
| Hook Point | 11 |
| Kingfisher Bay | 7 |
| Waddy Point | 8 |
| Wathumba | 1 |
| West Coast Creeks | 3 |
| Grand Total | 76 |

In addition, nearly 80% (43 of 54 known-age dingoes) of all dingoes destroyed at any time were animals less than 18 months old (Figure 23), which are unlikely to be alpha animals, animals that successfully raise litters, or animals that substantially contribute to pack stability (Breckwoldt 1988; Corbett 2001; Fleming et al. 2001). Moreover, of the 59 known-gender and non-sick/injured dingoes destroyed during this period, 69% (n=41) were male and only 31% (n=18) were female. Destruction of dingoes occurred at all times of the year for both sexes, although the majority of male dingoes were destroyed between April and October (Figure 24). No more than four female dingoes in total have been destroyed in any one year, and no more than two female dingoes (usually one) were destroyed between June and September (breeding and whelping seasons;

Corbett 2001) in any one year. These data demonstrate that sexually mature females are very rarely destroyed during the breeding and whelping period. Thus, the loss of so few animals from such a demographic is highly unlikely to have short-term or long-term adverse impacts on dingo population sustainability or social stability (e.g. Caughley and Sinclair 1994; Krebs 2008).

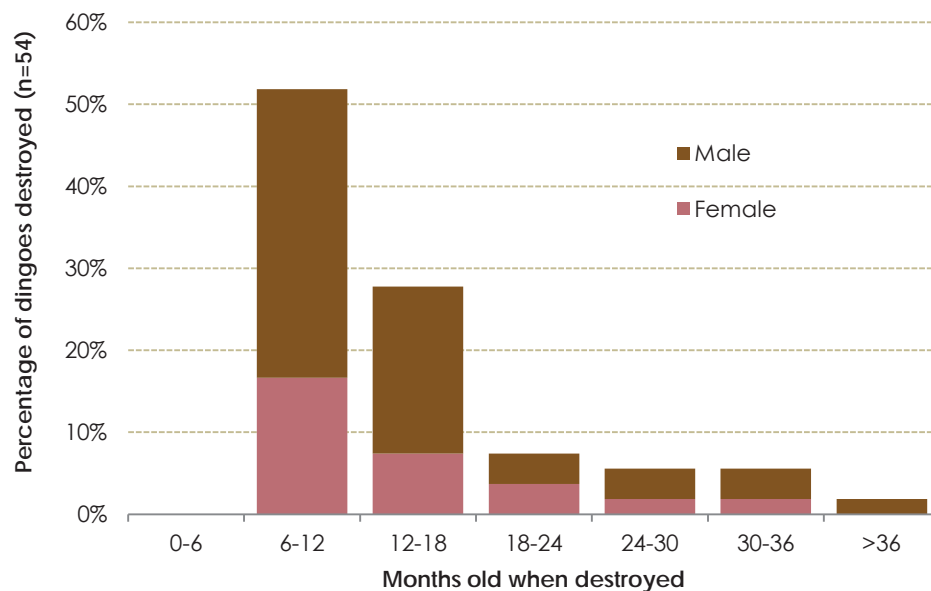


Figure 23 Ages of 54 non-sick/injured dingoes humanely destroyed between January 2002 and October 2012.

Analyses of trends in incidents suggest that the highest rates of Code C and E incidents occur in March and April, during dingo mating season and peak visitation around Easter (Figure 25).

Several other incident peaks appear to coincide with periods of peak visitation (i.e. school holidays) and with key times in the dingo breeding life cycle (i.e. July as the peak of the birthing season).

The majority of incidents are also restricted to high use visitor nodes, with 90% of Code D and E incidents in six areas (Figure 26), and 75% of all incidents at only four (Figure 27).

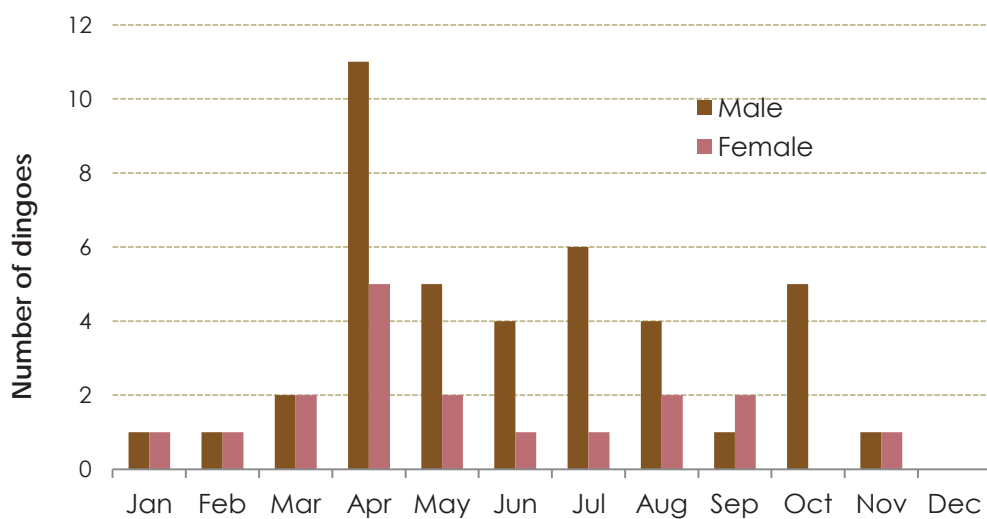


Figure 24 Gender and timing of 59 known-gender dingoes destroyed between January 2002 and October 2012 (excluding eight known-gender sick or injured dingoes destroyed).

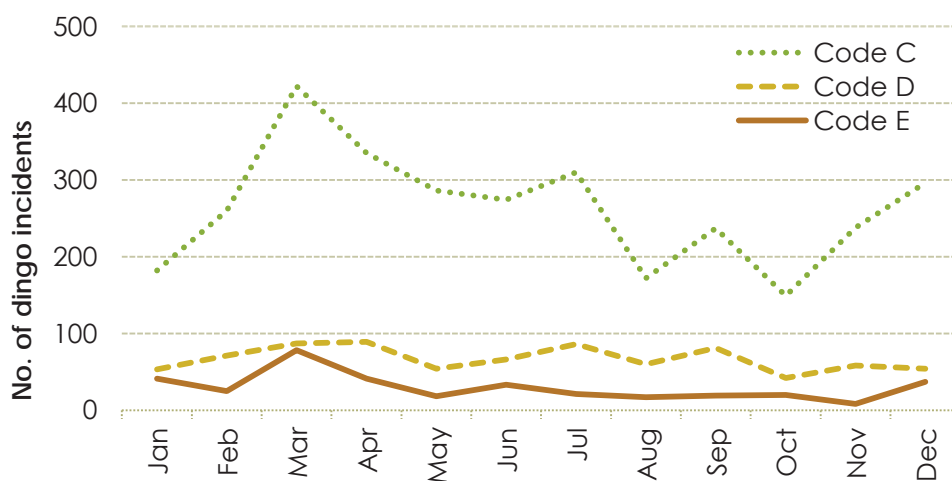


Figure 25 Monthly trends in incidents. Code C incidents include loitering or stealing food, Code D incidents include overt aggression towards humans, and Code E incidents include serious attack.

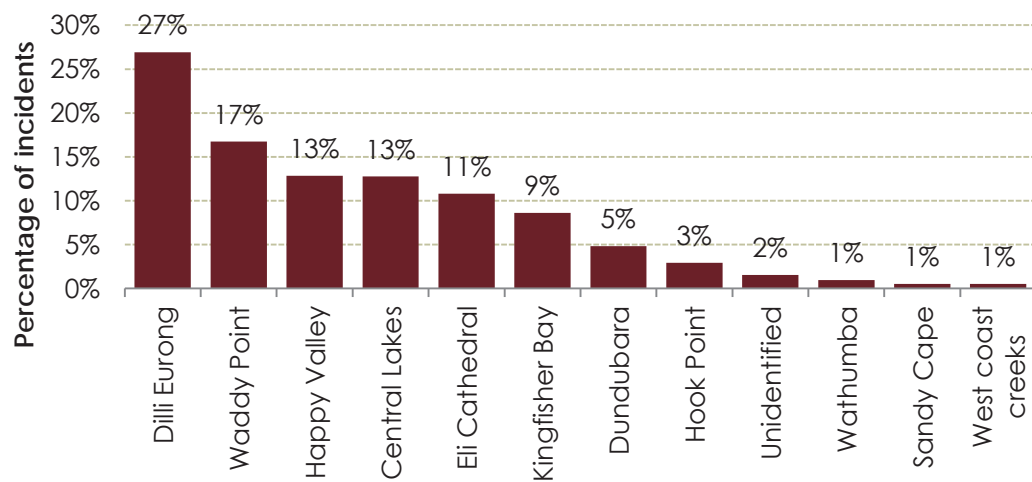


Figure 26 Geographic location of more serious Code D and Code E incidents January 1992 - July 2012. Incidents have been grouped into 12 general regions

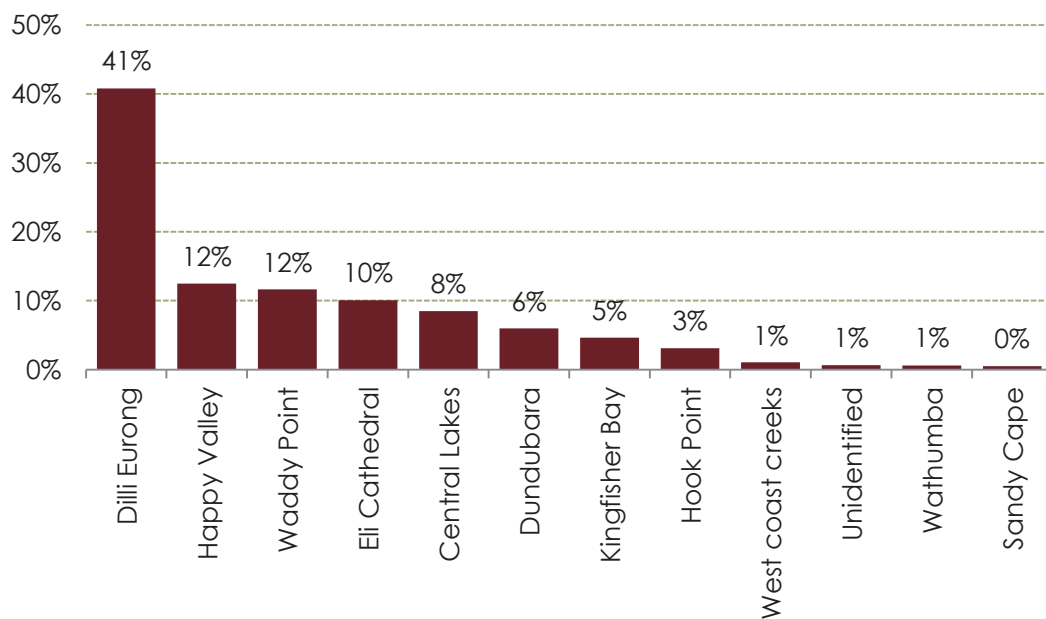


Figure 27 Geographic location of all incidents January 1992 - July 2012. Incidents have been grouped into 12 general regions

As the majority of incidents occur in limited locations and during times of peak visitation, additional visitor education and management at peak periods should continue as a priority.

Given that many incidents are at a few selected areas of the Island, temporary or seasonal campground closures should also be considered. Targeted temporary closure of unfenced campgrounds will need to be responsive to the rapid (i.e. daily) changes in risk, and may offer the opportunity to substantially reduce the risk to human visitors while reducing the likelihood that dingoes will require destruction at a future time.

Although based largely on expert opinion and anecdotal reports rather than population studies, Figure 28 suggests that long-term dingo abundance trends on Fraser Island appear to be stable.

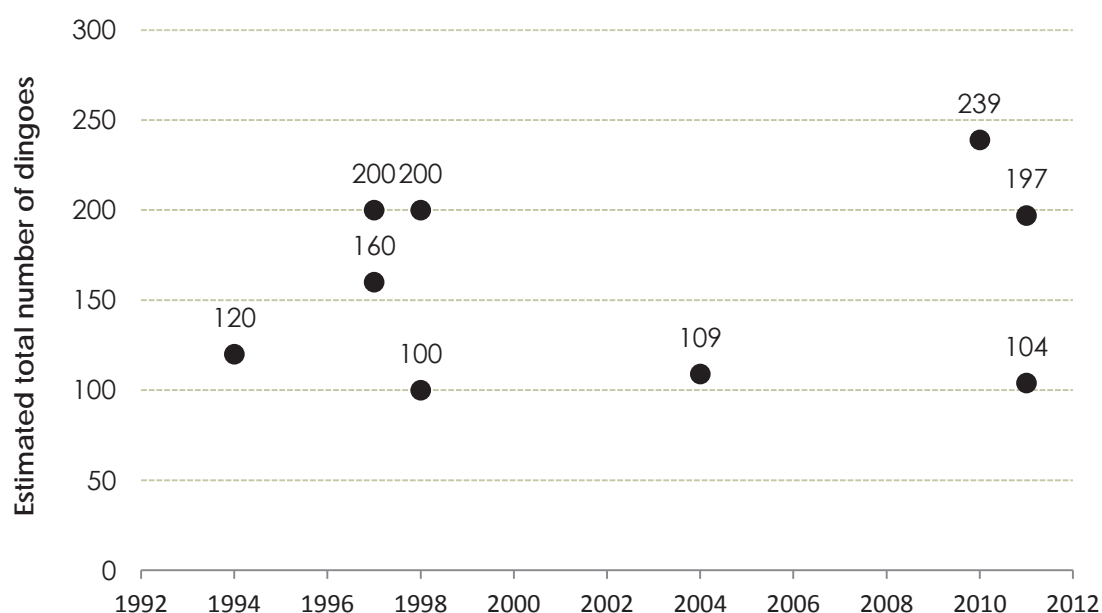


Figure 28 Trends in the estimated total number of dingoes present on Fraser Island 1992–2012. Note: most values are derived from expert opinion and anecdotal records and not empirical data. Sources: 120 (Moussallini, 1994); 160 (Ministerial, 1997); 200 (Ministerial, 1997); 100-200 (Corbett, 1998); 109 (Baker, 2004); 239 (QPWS ear tag register 2010); 104-197 (Jones and Appleby, 2011).

Given the age and sex ratio of dingoes destroyed, along with apparent abundance trends in Figure 28, it appears that the current level of dingo destruction associated with aggressive or dangerous behaviour would be unlikely to impact the sustainability of the dingo population. However, it cannot be overstated the urgent requirement for detailed and accurate population data to effectively evaluate potential impacts of the FIDMS, and provide a robust framework for management. As detailed in Section 4, the population should initially be determined through collecting and analysing DNA samples from as many dingoes as possible. This can be done using non-invasive techniques (e.g. Baker In prep; Berry et al. 2012). This may provide accurate and cost-effective population data. Ongoing monitoring should then focus on population change, which can be monitored using indices of relative abundance (Caughley 1980; Engeman 2005; Long et al. 2008). Data that could contribute to the calculation of such indices are already being collected in current programs (i.e. trapping program, camera monitoring), and could be

supplemented by sand plots or other similar measures of abundance if needed. Only minor changes to data collection are required to enable such analysis of current datasets, as detailed in Section 3.12.

Monitoring change in the population is considered more important than regular identification of a finite population estimate (which will vary considerably in short periods of time). In other words, knowledge of relative abundance trends is of greater value than an absolute abundance estimate. Calculating the minimum viable population would also assist in modelling different management actions and assessing potential impacts associated with each. However analysis of the age structure of the population (which might be done through current programs with correct data collection), and ongoing monitoring of trends (increasing or declining) is considered more appropriate to monitor the Fraser Island dingo population and ensure its sustainability.

Further population studies required are detailed and prioritised in Section 4.

While there is limited data to demonstrate that humane destruction reduces incidents, it would not be appropriate to allow dingoes assessed as dangerous to remain on the Island where they pose an unacceptable level of risk to people. The most obvious alternative option to humane destruction is relocation to a captive centre, which has been discussed in Appendix 5. While public perception may be improved with relocation, it is likely, and supported by previous trials (QPWS 2006), that the subsequent confinement would cause the individual to suffer and result in negative welfare outcomes.

3.9.2 Dingo hazing

Hazing is a non-lethal approach designed to deter dangerous wildlife from frequenting certain areas and re-instil in them a natural fear of humans. This is a commonly used technique as a part of a holistic approach to managing a variety of dangerous wildlife around the world, including wolves, coyotes and bears.

Although a variety of techniques might be used, hazing of dingoes on Fraser Island has primarily been through the use of sling-shots (firing clay pellets) and shotguns (with non-lethal 'ratshot' projectiles) (QPWS 2006).

To be effective, hazing needs to be done consistently and intensively, using a variety of techniques on a random schedule. This is required to avoid habituation to deterrents rendering them ineffective and potentially increasing the animal's tolerance, which is in direct conflict with the aim of this technique. This may also make them more difficult to deter in a dangerous situation. Furthermore negative reinforcement, such as hazing, may cause aggressive or unpredictable behaviour in some individual animals.

Any aversive conditioning, such as hazing, must be done in such a way that dingoes associate the aversive stimuli with their own behaviour (e.g. moving into a certain location) rather than to the presence or behaviour of the person conducting the hazing. The strong tendency of domestic dogs to perform discriminative learning (where they learn a new behavioural response only in a certain context), and to associate punishment with the person doing the punishing rather than their own behaviour, suggest another likely obstacle to effectiveness of hazing. Thus aversive conditioning techniques which do not require the presence of people (such as electric collars or

fences) are more likely to be effective. As discussed in Section 3.9.3, potential welfare impacts of such techniques must be thoroughly investigated when determining their appropriateness.

Observations by rangers suggested that hazing did not dissuade older dingoes that had already habituated to humans, but seemed to be more effective on younger naive animals. Through dingoes associating hazing with rangers, it also appeared to discourage dingoes from rangers only, rather than discouraging them from visitors or artificial food (as suggested above).

The variable results of hazing led QPWS to unofficially suspend the practice, and ranger interviews indicate that hazing has seldom been undertaken since 2010 (QPWS 2012, pers. comm., 6 Oct).

While hazing of Fraser Island dingoes was being conducted, records were not maintained at a level suitable to analyse its effectiveness or potential impacts associated with the activity. As such hazing should be officially abandoned until suitable research trials can determine its efficacy and potential behavioural and welfare impacts. Such research should also consider potential varying effectiveness on individuals of different ages to determine whether it may be more useful for certain age categories, and should be undertaken in association with research exploring alternative non-lethal management actions.

If future trials confidently show that hazing can be done on in a humane manner without increasing the human safety risk, resources should be made available to ensure effective implementation.

It is also recommended that if hazing is considered in the future, that it only be conducted on individuals exhibiting or expected to exhibit problematic behaviour, and not indiscriminately on all individuals or for only occasional loitering behaviour.

3.9.3 Other non-lethal measures

Shock-collars, aerosol sprays, non-toxic bitter baits or baits designed to make the animal vomit (i.e. emetics), flashing lights, alarms, ultrasonic devices or fladry tape are alternative non-lethal aversive conditioning methods designed to stimulate a learned response for an animal to avoid an object, area or undesirable behaviour.

A comprehensive review of non-lethal control techniques for predators was undertaken by van Bommel and Johnson (In press), which suggested that few non-lethal techniques are likely to be effective on mainland dingoes. Where non-lethal techniques have been trialled on island dingoes, results show that they are unlikely to be of practical use for managing dingoes on Fraser Island also. For example, the controlled trials of Edgar *et al.* (2007) showed that captive-dingoes were not averse to seeking out and eating a small sample of tuna in the presence of an ultrasonic device designed to deter them. In another study, shock-collars failed to prevent habituated dingoes from acting aggressively towards humans, where all dingoes fitted with collars were ultimately destroyed for subsequent incidents (R Appleby and D Jones 2012, pers. comm., 12 Oct). Importantly, it should be noted that these were only preliminary or pilot studies, and insufficient exposures to the aversive stimulus were undertaken to give the technique a realistic chance to be effective.

Tauchmann (unpublished) trialled aversive baits to condition dingoes to avoid backpacks, tents

and other human sources of attraction. Despite extensive efforts, this report could not be sourced. It was suggested this trial was unsuccessful due to the large variety of attractants, containers and food types available on Fraser Island (QPWS 2012, pers. comms., 6 Oct). Despite these results, many animals are known to learn quickly from aversive food conditioning, and so this non-lethal technique holds promise if implemented correctly.

Many other suggested techniques (Appendix 5) such as the use of fladry tape, playing dingo calls and attempting to scent mark artificial territory boundaries, are commonly used by dingo trappers as attractants and not repellents (Fleming *et al.* 2001). Therefore these are unlikely to be effective at dissuading habituated dingoes from humanised areas in the long term.

Although presently used in a limited capacity, temporary campground closures appear to be a much underutilised non-lethal approach to dingo management on Fraser Island, and should be explored with greater effort as an alternative approach to the aforementioned techniques. The decision to close campgrounds should be based on context-specific risk assessments identifying a high level of risk to human safety. For example, if the number of Code C incidents is increasing and prey resources are not expected to be sufficient for the extant dingo population (e.g. during the summer months when a surplus of juvenile dingoes are dispersing), then temporary campground closure may allow time for dingo society to regulate itself without interference from humans. Such a strategy may reduce the likelihood of dingoes habituating and eventually becoming targeted for humane destruction.

Early intervention actions, such as sterilising habituated females with appropriate veterinary drugs designed for this purpose, may help break the cycle of habituated females teaching young inappropriate behaviour which may lead to aggression.

With additional research and scientific trials, aversive conditioning and early intervention may provide effective management tools that reduce the requirement for humane destruction. However, it is imperative that any trial be preceded by rigorous investigation into potential welfare and behavioural impacts on both dingoes and other wildlife in that may be impacted.

Investigation into positive reinforcement techniques is also recommended, which would be desirable for welfare reasons if they exist. These would involve positively reinforcing a behaviour that provides a desirable mutually exclusive behaviour i.e. moving elsewhere. It is critical that food rewards are not used (for reasons detailed in 3.4.1), and that dingoes do not associate the positive reinforcement with humans.

3.10 Quarterly dingo risk assessments

Risk assessment reports undertaken by QPWS for all visitor nodes and townships across the Island comprise the following for each quarter:

- total number of Code C, D and E incidents
- total number of sites at each risk level (extreme, high, moderate, low, very low).
- brief detail on each Code D and E incident
- number of humane destruction orders and actual destructions

- discussion of issues influencing dingo behaviour (i.e. season, interference, etc.) including key points for consideration during next quarter.
- monthly comparative analysis of monthly Code D and E incidents over time (since 2009)
- comparison of risk levels with previous three quarters.
- management actions under four headings:
 - incident, education and visitor safety management (including number of dingo briefings and signs installed etc.)
 - compliance (including the number of infringement notices)
 - research
 - administration (including time spent on RTI requests)
 - recommendations.

The quarterly risk assessment reports provide a good summary of key management activities and issues for the reporting period, and some detail on anticipated issues. Currently they appear to function mainly as a reflective reporting tool, but it is unclear how they are utilised as an effective predictive or evaluation tool which should be their primary role.

Important data to allow effective analysis of risk over time and evaluate controls appears to be somewhat lacking. As a minimum, these additional data should include:

- spatial information i.e. coordinates of incidents, fence lines, facilities, etc.
- visitor numbers or some quantitative index of use
- specific dates of management actions and facility upgrades.

The relationship between these data should also be investigated, particularly for high risk sites. An effective method to compare and analyse this information would involve the transfer of relevant data to a spatial database to allow trends to be identified.

There is reportedly still some observer bias associated with assigning risk levels using the current matrix (Appendix 17). A more detailed risk calculator was trailed several years ago, however was reported to be cumbersome and difficult to use, and resulted in artificially elevated risk scores. Therefore it was abandoned in favour of the risk matrix system previously used. Observer bias is now minimised with team agreement of risk scores. This should be continued, and the team assessing risk should be kept as consistent as possible to provide for comparable data over time. Actual risk scores assigned to each site are provided in Appendix 18.

It is recommended that as part of the risk assessment, visitor nodes identified as high risk are systematically audited to identify the need for additional improvements or to expedite scheduled maintenance of current facilities if required.

The current assessments are considered effective at addressing risk present at the time of assessment; however their usefulness at effectively predicting likely risk in the future is unclear. Analysis of spatial data over time would greatly assist its use as a predictive management tool.

Data limitations are reasonable given resource constraints, but if the capacity to use the data

more effectively cannot be addressed within available resources, it is questionable as to whether it is worth collecting all data as per current practice.

Streamlining reports should be considered where possible to allow time to be reallocated to data analysis and effective use of the information.

The provision of actual databases (i.e. infringement records) would also appear to reduce duplication associated with summarising data from these sources.

Many of the sites that are assessed have been at low or very low risk levels for extended periods (Appendix 18). Furthermore, the use or name of some requires updating, and there seems to be an unnecessary division of some sites (i.e. Lake McKenzie campground, hikers camp; main beach; public carpark; bus park and BBQ site; Appendix 18). There is potential to limit the number of sites or limit the frequency at which they are assessed (i.e. for those that have not changed in risk between quarters, or persist with an acceptable (low) level of risk). Potential scope to temporarily exclude or combine sites must be determined by operational staff with good general knowledge of site-specific issues.

3.11 Dingo management records

As discussed throughout, many dingo management databases were deficient in providing key information needed to address the many research and management concerns raised by QPWS and external stakeholders. This deficiency is not only about a lack of appropriate data being collected, but also a lack of transfer to electronic format, and inconsistency between databases, which makes it difficult to cross-check information between them or investigate the more complex eco-management issues.

As recommended in the 2006 FIDMS, and reiterated in the 2009 audit (Corbett), the collation of data into a centralised database would improve efficiency of data entry and greatly assist data analysis. While this would require significant initial investment, it would certainly be outweighed by the long-term benefits and efficiencies (including resource savings). Research institutions with experience in handling large databases and datasets on dingoes and dingo management may be able to assist QPWS in developing more efficient data management protocols.

Lack of key information in databases appears to be related to the responsive nature of the roles filled by many QPWS staff. In particular, the equivalent of nearly three full-time staff is required to respond to RTI and other requests by the public (QPWS 2012, pers. comm., 6 Oct).

While such avenues are important to ensure Government transparency and accountability, efficiencies should be implemented where possible. This will allow more time to efficiently manage databases, and improve the capacity of QPWS to collate and disseminate information to the public in a more rigorous way than is currently possible. Attempts should be made to improve the utility of these databases for QPWS and end-users, which may ultimately increase the information made available to the public and reduce the necessary time to respond to RTI requests.

Lack of accurate and easily accessible visitor number data is a critical weakness in the ability to evaluate the effectiveness of the FIDMS. Obtaining accurate, complete, and regular data on visitor numbers must be achieved in the future.

Briefings data is presently collected on the number of face-to-face interviews or discussions between rangers and visitors, referred to as 'campground briefings'. Such data can be used to quantify incident reporting effort. Data should be collected at a fine spatial scale (e.g. site level, or campground level) in order to maximise the utility of the data.

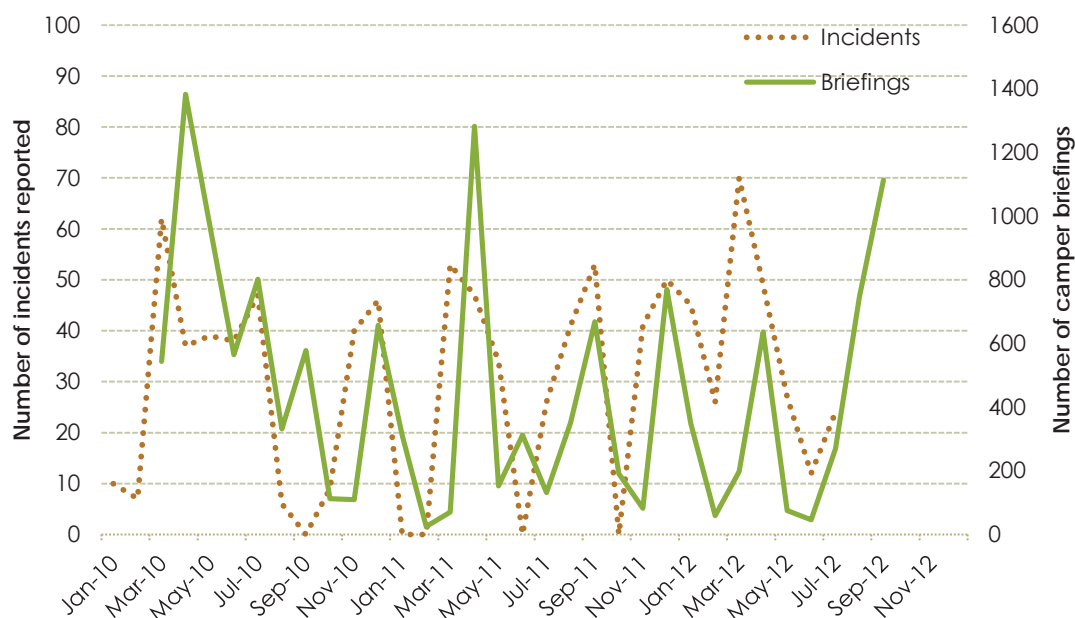


Figure 29 Trends in campground briefings and incidents (Code C, D & E) January 2010 to September 2012.

There is a positive correlation between the number of briefings and the number of recent incidents reported (Figure 29) (df 28, $R^2=0.1177$, $p=0.0685$), but briefings appear to lag behind incidents by approximately one month.

These data, along with consultation with QPWS staff, suggests that briefings are increased at times of high incidents, and also that increased effort seeking information from visitors is capturing information that may otherwise be unreported. Incidents may also be reported in this way some time after they occur. Briefing data is therefore important in determining whether or not changes in incident rates are related to changes in reporting rates or in actual incidents. The collection of accurate briefings data should be considered essential to the ongoing management of human-dingo conflicts.

Similar to the issue described above for briefings data, accurate data on visitor numbers is paramount to evaluating potential causes for changes in dingo incident rates. In other words, 'the number of incidents' is not as important as 'the number of incidents per visitor'. Available data on visitor numbers is inaccurate, incomplete, inconsistent, and/or difficult to obtain due to a variety of visitor types, recording systems, and agencies responsible for collecting the data. Without comprehensive and accurate visitor data, the potential for bias towards an artificial change in incidents associated with reporting effort could not be explored.

Field data capture techniques, such as tablet computers, are reportedly being trialled. The

movement from paper records to electronic data capture has the potential to greatly streamline the data management process, and add rigour to the program. This change should be expedited with consideration to the cost benefit associated with reduced data entry, more reliable and consistent data, and timely and reliable analysis.

3.12 Research and management actions

Relevant research published since 2006 has been reviewed and summarised in Appendix 8. Results of these studies were used to inform recommendations for management actions.

A greater understanding of dingo ecology and appropriate management cannot be achieved without additional research effort. This includes ecological, social, and economic research.

The lack of a strategic research plan is also a key weakness of the FIDMS. The available dingo research we reviewed appears to be somewhat haphazard, in that the research activities undertaken do not appear to be contributing to a clear research direction. It would seem that third parties are largely directing what research is undertaken, and that QPWS has little input into coordinating research activities around an applied research theme suitable for improving the FIDMS. This is not to say that the research conducted to date is not useful, but that it does not appear to be coordinated in an optimal way.

A strategic research plan should be developed as a matter of priority. This plan should identify specific research projects which address key applied science questions (e.g. do humane destructions inhibit the viability of the dingo population, is the dingo population declining, or does hazing increase aggressive behaviour from individuals hazed?). The protocols for each project should be clearly developed and harmonised to provide maximum returns on research effort. Third parties should be engaged to deliver these projects where QPWS resources are insufficient to do so.

Despite the above, it is clear that a great amount of data has been collected by QPWS which, if collated in a usable format and analysed appropriately, will provide a great amount of information for improving the FIDMS.

Several streams of data are presently being collected and should continue to be collected. These include data on:

- dingo incidents (including location, date, time of day, code, etc)
- humane destructions (including age, sex, location, date, etc)
- risk level trends (including site and contributing factors)
- ear tag register (including age, sex, location, date, time, ear tag colour and placement, weight, body condition, foot caught, identifying features, etc)
- visitor surveys.

The presently available information in these datasets already has the capacity to address several key knowledge gaps suitable for improving the FIDMS, such as the influence of humane destruction activities on the breeding component of the dingo population (described earlier).

There are also several streams of data which are not being collected at present, but which should be collected in the future. These include data on:

- campground briefings (i.e. number of briefings per month)
- visitor numbers (i.e. number of visitors per day/month)
- trapping effort (i.e. number of captures per trap-night)
- dingo sightings (i.e. dingoes photographed on automated cameras)
- dingo movements (i.e. from DNA samples or GPS collars)
- dingo abundance and population structure (i.e. from DNA samples and tagging data)
- rate of infringements (as opposed to issuing of penalties).

By making a series of small, but important amendments to current data collection practices in order to obtain these data, great advances can be made in our knowledge of dingo ecology and management with little financial investment. For example, strategic DNA sampling, remote camera use, and the collection of the right pieces of information during the routine trapping and tagging program have the potential to yield all the data necessary to measure changes in dingo population abundances and demographics over time, negating much of the more non-applied research activities currently being undertaken or proposed.

Also of concern is that data dissemination is significantly lacking. At present, only limited information is made available on the internet, with RTI requests by selected stakeholder groups comprising much of the information dissemination. This situation fosters scepticism and disharmony from the public. As noted in earlier reviews of the FIDMS (Corbett 2003 and 2009), a greater emphasis on the production of peer-reviewed technical reports and scientific articles has not been achieved and is still required. Additional resources or efficiencies are likely required to resolve this situation.

Research priorities have been detailed in Section 4.4.

3.12.1 Dingo trapping and tagging

Assessment of the ongoing trapping and tagging program highlighted a need for improved efficiency. At present, a limited number of soft-catch foot-hold traps are set in a few locations and monitored at least every three hours throughout the night by a limited number of staff. When a dingo is trapped, it is sedated, processed, and transported to a recovery facility where it remains for several hours before release back at the original capture site.

These activities are conducted under approval from an animal ethics committee, which oversees and evaluates the process for compliance with recognised animal welfare standards. Even so, a variety of amendments could be made to this program in order to gain efficiencies with productivity, animal welfare, OH&S, time, and resources. Key improvements may include the following:

- Change the type and amount of lure used at individual trap sites to reduce the likelihood of inadvertent recapture, habituation, and risk to non-target species.

- Reduce the number of individual traps used to capture one individual dingo to ensure best practice animal welfare outcomes and increase the number of available traps.
- Use a trap-alert system to reduce the need for regular checking of traps and reduce the time a dingo spends in the trap. Systems are available that can be used outside the mobile communications network.
- Replace pin-down poles with catch-poles to increase human safety and reducing potential injury to the dingo.
- Reassess the use of sedatives for standard handling and minor procedures. Minimising drug use can reduce the likelihood of potential complications arising, eliminate the need for dingo transport and recovery, reduce the time it takes to process the dingo, and increase the amount of staff time available to monitor additional traps. However, potential benefits of sedatives should be further explored before disbanding them i.e. creating partial retrograde amnesia to reduce negative associations could in some instances possibly reduce risk of subsequent aggression.
- Limit ear tagging to individuals weighing more than 10 kilograms, consistent with current policy. Body condition should also continue to be considered. Maintaining size and condition limits for tagging will provide for best practice welfare outcomes.
- Tagging should continue to be restricted to individuals exhibiting or anticipated to exhibit problematic behaviour, and not all dingoes.

Early identification of a habituated dingo allows QPWS staff to best manage that animal, and the people in its territory, to reduce the likelihood of negative human-dingo interaction (i.e. increased signage and briefings around hot spots to ensure extra vigilance, closure of camp grounds if required, etc.). This ability for managers to intervene ultimately reduces the need for humane destructions. In the event of a serious incident, the positive identification of an individual also prevents the need for less discriminate cull.

It is recognised there are some design flaws with the current tag (i.e. colour fading and delamination of coloured stickers) and QPWS are working to overcome these issues. Many other methods have been trialled (i.e. alternative tags, colour-marking) however as discussed in Appendix 5, these have proven unsuitable. Continued research into alternative methods should continue, with the current tags being used until such time a suitable alternative can be identified.

Knowledge of long-term dingo abundance trends is fundamental to the best-practice management of dingoes on Fraser Island. A range of techniques are available and commonly used to monitor dingoes and other terrestrial vertebrates (Engeman 2005; Long et al. 2008), but given logistical constraints and the high number of visitors on the Island, the most cost-effective approach may be to use remote camera technology to collect baseline information on the relative abundance of dingoes (and other fauna). Data from the trapping and tagging program, coupled with additional DNA data that could be collected at the time, may also provide information useful for evaluating changes in dingo abundance and population demographics.

3.13 Audit

3.13.1 Previous audits and reviews

Prior to the current independent review, one full review and two audits have been conducted on the FIDMS since it was first developed in 2001.

As detailed in Section 3.6, two education-specific reviews were completed in 2003 (Environmetrics 2003), and a visitor survey in 2012 (Deborah Wilson Consulting Services 2012).

A total of 82 actions from the 2001 FIDMS were audited in 2003 (Corbett), and 91 actions from the 2006 FIDMS were audited in 2009 (Corbett).

Both the 2003 and 2009 audits provided suitable detail on progress of actions. Each audit report summarised action progress, prioritised actions for subsequent implementation and provided specific recommendations relevant to the audit period for the continued implementation of the FIDMS. However, the lack of indicators meant that these assessments were completely subjective. This should be addressed for future audits, with indicators to facilitate objective evaluation included in the revised FIDMS. Such indicators will also ensure QPWS have a clear understanding on how to progress and achieve each action.

A key outcome of the 2009 audit was the development of the Implementation Schedule 2010-2015 as part of the 2004 Communication plan. This has since been developed, and actions from both of these documents have been audited, as detailed in Section 3.13.2.




Recommendations from the 2003 audit have not been audited due to them being outside the current review period, and presumably superseded by those in the 2009 audit. Recommendations from the 2009 audit were incorporated into indicators and assessed as for level of implementation as part of the audit of the 2006 FIDMS actions.

There was no report available for the full review of the 2001 FIDMS leading to the revised 2006 FIDMS, which reportedly involved direct input into the FIDMS document.

3.13.2 Level of implementation of current FIDMS actions

Assessment of progress on the 91 actions from the 2006 FIDMS is summarised in Table 4 with 5 actions complete; 40 ongoing and progressing appropriately; 28 ongoing and require progression; 12 not yet achieved; and 6 recommended for exclusion. Full detail is provided in Appendix 19.

Table 4 Assessment of progress on the 91 actions from the 2006 FIDMS

| Strategy | Action number | Action | Progress status |
|---|---------------|--|---|
| Strategy 1 Comprehensive scientific research and monitoring will continue to be undertaken to ensure the principles and practices of dingo management are sound. | 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. |  |
| | 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. |  |
| | 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. |  |
| | 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. |  |
| | 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. |  |
| | 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. |  |
| | 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. |  |
| | 8 | Skulls from dingo corpses will continue to be collected and measured to monitor hybridisation. |  |
| | 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. |  |
| | 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. |  |
| | 11 | Results from dietary analysis of gut contents from autopsied animals will be analysed and correlated with scat sampling results. |  |
| | 12 | Research and monitoring of dingo behaviour and human-dingo 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. |  |


| Strategy | Action number | Action | Progress status |
|----------|---------------|---|---|
| ecosure | 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. |  |
| | 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. |  |
| | 15 | Island visitors will be surveyed about dingo incidents and responses correlated with incident reports by Rangers. |  |
| | 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. |  |
| | 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. |  |
| | 18 | Workplace health and safety reporting will be continued as a high priority. |  |
| | 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. |  |
| | 20 | Training programs will be regularly evaluated and updated to ensure new information is incorporated and techniques remain valid and consistent. |  |
| | 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. |  |
| | 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. |  |
| | 23 | Funding options for core research projects such as population biology/dynamics and dietary ecology will be investigated. |  |










| Strategy | Action number | Action | Progress status |
|--|---------------|--|---|
| Strategy 2 Awareness programs will continue to encourage appropriate behaviour towards dingoes by island visitors, residents and staff. | 24 | Research proposals and funding arrangements will be negotiated with interested universities and research organisations. |  |
| | 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. |  |
| | 26 | 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. |  |
| | 27 | 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. |  |
| | 28 | 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. |  |
| | 29 | Recent social sciences research and Internet discussions on human behaviour will continue to be investigated for possible application to dingo awareness programs. |  |
| | 30 | 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. |  |
| | 31 | All visitors to the Island, including those on day-tours, will continue to be provided with the dingo information brochure. |  |
| | 32 | Contractual arrangements will be established with all private permit issue centres to ensure dingo safety information is provided to all visitors. |  |
| | 33 | Meetings and newsletters will continue to inform Island residents and resort staff about dingo-human interactions. |  |
| | 34 | 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. |  |
| | 35 | 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. |  |
| | 36 | 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. |  |









| Strategy | Action number | Action | Progress status |
|----------|---------------|---|---|
| | 37 | 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. |  |
| | 38 | Visitors, residents and staff will be urged to regard dingoes as wild animals seen infrequently, rather than semi-domesticated camp dogs. |  |
| | 39 | Techniques and media will be investigated to ensure the education message becomes even more effective. |  |
| | 40 | The campground rangers will continue to support the public contact program. Efforts will focus on priority areas like beach camping and fishers. |  |
| | 41 | 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. |  |
| | 42 | 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. |  |
| | 43 | Rangers will leave notes on unoccupied tents recommending ways of dingo-proofing camps. |  |
| | 44 | The effectiveness of dingo reminders at tents at selected campgrounds will be tested and monitored. |  |
| | 45 | 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. |  |
| | 46 | 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. |  |
| | 47 | Fraser Island residents and resort staff will be surveyed about their knowledge of and attitudes to dingoes including feeding, attacks, management, regulation and penalties. |  |
| | 48 | 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. |  |
| | 49 | QPWS will consider a dingo safety/ awareness week to be held during peak visitor periods. |  |
| | 50 | Negotiations will be continued with the Maryborough and Hervey Bay City Councils to establish co-operative management and enforcement arrangements across all tenures. |  |

Strategy 3
The dingo-human
interaction will be

| Strategy | Action number | Action | Progress status |
|--|---------------|--|---|
| managed by increasing Island-wide facilities and services that discourage dingoes from interacting with people and obtaining human food, and by prohibiting dingo feeding. | 51 | Local governments will be encouraged to fund the provision of dingo-proof garbage bins for all ratepayers. |  |
| | 52 | 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. |  |
| | 53 | Resort management will be encouraged to continue disciplinary procedures for staff found feeding dingoes or leaving food available or failing to secure food. |  |
| | 54 | QPWS will pursue changes to address legislative anomalies on land tenures not covered by the protected area estate (e.g. 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. |  |
| | 55 | Greater effort will be directed towards dingo-related law enforcement and regulatory activities. |  |
| | 56 | 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. |  |
| | 57 | The level of visitor non-compliance with regulations and best-practice guidelines in situations of confrontation with dingoes will be monitored and recorded. |  |
| | 58 | 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. |  |
| | 59 | 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. |  |
| | 60 | All new developments for day use and camping areas will ensure appropriate facilities are in place to address dingo management issues. |  |
| | 61 | 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. |  |
| | 62 | Four-wheel-drive hire companies and backpacker hostels which provide or hire camping gear will be encouraged to provide dingo-proof food crates. |  |

| Strategy | Action number | Action | Progress status |
|---|---------------|---|---|
| Strategy 4 Programs will continue to be implemented to modify dingo behaviour and habits, which threaten human safety and wellbeing. | 63 | The application of restrictions on fish cleaning at selected high-use sites will be continued. |  |
| | 64 | The provision of specially designed fish cleaning facilities at some locations will be investigated for feasibility. |  |
| | 65 | The feasibility of providing fish offal mincing stations during Tailor season will be investigated. |  |
| | 66 | The consumption or display of food at selected day use areas, e.g. high-use lake-side beaches, will be prohibited. |  |
| | 67 | 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. |  |
| | 68 | 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. |  |
| | 69 | Additional restrictions on camping at particular areas known to attract dingoes, e.g. barge landing sites and water points, will be continued. |  |
| | 70 | 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. |  |
| | 71 | 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. |  |
| | 72 | 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. |  |
| Strategy 4 Programs will continue to be implemented to modify dingo behaviour and habits, which threaten human safety and wellbeing. | 73 | 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. |  |
| | 74 | 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. |  |

| Strategy | Action number | Action | Progress status |
|--|---------------|--|---|
| Strategy 5 Any dingo identified as dangerous will be destroyed humanely using accepted methods after receiving appropriate approvals. | 75 | New advances in ultra sonic deterrent or alternative technology will be monitored for possible application in dingo management programs. |  |
| | 76 | 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. |  |
| | 77 | 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. |  |
| | 78 | 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. |  |
| | 79 | 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. |  |
| | 80 | 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. |  |
| | 81 | Staff will be trained and equipped to humanely trap, handle and euthanase dingoes and to undertake autopsies and data collection. |  |
| | 82 | 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. |  |
| | 83 | Providing scientific evidence supports it, a small cull of dingoes may only be undertaken by applying the same practices as identified under Strategy 5. |  |
| Strategy 6 A cull to a sustainable | | | |

| Strategy | Action number | Action | Progress status |
|---|---------------|---|---|
| level may be undertaken only if research can show the population is not in balance with the seasonal availability of natural foods. | 84 | <p>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:</p> <ul style="list-style-type: none"> 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) assessing the genetic make-up of the dingo population (level of hybridisation and genetic diversity) via skull measurements and any DNA analysis techniques. |  |
| | 85 | Continual monitoring of risk factors including changes in visitor pressure and the availability of human-derived food will be conducted at all sites. |  |
| | 86 | 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. |  |
| | 87 | Risk calculator variables should be regularly reviewed to confirm their validity. |  |
| | 88 | Additional risk assessments will be conducted for all non-protected land tenures on the Island, wherever possible utilising cost sharing arrangements. |  |
| Strategies in maintaining these levels at an acceptable (low) level. | 89 | Management actions will be reviewed periodically to assess the success of the program and to incorporate the results of research and newly available technologies. |  |
| | 90 | Reporting on implementation of dingo management strategies will occur three monthly. |  |
| | 91 | 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. |  |

Categories for progress status



Recommended for exclusion



Not yet achieved



Ongoing and requires progression



Ongoing and progressing appropriately



















Complete










Audit of the 15 assessable actions from the Communication plan 2004, as summarised in Table 5, identified that 2 are complete; 3 are ongoing and progressing appropriately; 8 are ongoing and require progression; and 2 are not yet achieved. Full detail is provided in Appendix 20.

10 additional actions from the Implementation schedule 2010-2015 were audited, as summarised in Table 5, with 1 being complete; 3 ongoing and progressing appropriately; 4 ongoing and requiring progression; and 2 not yet achieved.






Actions recommended for inclusion in future strategies are detailed in Section 4.7.

Table 5 Audit of the 15 assessable actions from the Communication plan 2004 and the 10 actions from the Implementation schedule 2010 - 2015

| Landmark objective number | Action | Progress status |
|---|--|---|
| Communication Plan 2004 | | |
| 1 | Continue all ongoing obligations for implementation of the FIDMS. | (see Table 4) |
| 2 | Communicate findings of 2003 Education evaluation to residents, QPWS staff, commercial tour operators. |  |
| 3 | 3 positive dingo-related articles in local and state mass media, focusing on community benefits. |  |
| 4 | Develop short radio and TV announcements for Easter 2004; if successful continue in other peak times. |  |
| 5 | Develop new dingo information presentations. |  |
| 6 | Produce interpretive products aimed at children. |  |
| 7 | Refresh dingo brochure every 18 months. |  |
| 8 | Engage residents in dingo monitoring. |  |
| 9 | Engage tour guides in dingo monitoring. |  |
| 10 | Interpretive materials or presentations to visitors developed to raise visitor knowledge about dingo identification. |  |
| 11 | Investigate need for new signage to keep education messages looking new. |  |
| 12 | Develop tour guide and volunteer training re dingo safe messages. |  |
| 13 | Develop visitor questionnaires and run regularly. |  |
| 14 | Establish rigorous objective quantitative techniques for assessing risk and incidents. |  |
| 15 | Engage other EPA units to establish guidelines for presenting dingo information off park, including appropriate presentation of captive dingoes. |  |
| 16 | Phase out 'be dingo aware' materials and phase in 'Be dingo-safe!' campaign. |  |
| Implementation Schedule - Fraser Island dingo communication and community engagement 2010-2015 | | |
| (No numbering available for actions) | Develop and implement an issue management plan. |  |

| Landmark objective number | Action | Progress status |
|---------------------------|--|---|
| | Develop and implement a community engagement plan. |  |
| | Regular sign renewal. |  |
| | Visitor surveys at least every 5 years. |  |
| | Monitor and respond appropriately to web-based social media. |  |
| | Additions to QPWS website. |  |
| | Beyond basic behaviour messages. |  |
| | Gather and promote information on QPWS as effective dingo managers. |  |
| | Review Fraser Island visitor guide. |  |
| | Continue face-to-face ranger program and consider additional resources for this. |  |

Categories for progress summary

| | |
|---|---------------------------------------|
|  | Recommended for exclusion |
|  | Not yet achieved |
|  | Ongoing and requires progression |
|  | Ongoing and progressing appropriately |
|  | Complete |

4 Recommendations

Recommendations resulting from this review are detailed below. These include general recommendations (Section 4.1), those to be considered for future FIDMS document revision (Section 4.2), and for effective implementation of the FIDMS (Section 4.3). A revised action table is provided in Section 4.7. Sections 4.4, 4.5 and 4.6 provide context and further detail for key actions in Section 4.7.

4.1 General

Consider providing opportunity for public and/or key stakeholder contribution to the review following Ministerial consideration of the review report.

4.2 FIDMS document revision

- Consider revising the name of the FIDMS to reflect human management and conservation focus i.e. Fraser Island Dingo Conservation and Risk Management Strategy.
- To facilitate best practice evaluation it is recommended to develop:
 - objective and measurable indicators to assess achievement of the strategy objectives, with consideration given to developing targets that signify acceptable achievement of objectives (developed through a suitable process of stakeholder consultation)
 - objective and measurable indicators and targets for all actions in the FIDMS, building on those identified in the present report
 - explanations of how strategies relate to achievement of objectives
- Add two new objectives, with recommended new objectives shown in Table 6.
- Remove Strategy 6, add one strategy and revise wording in others as per Table 7.

Table 6 Current and recommended objectives for a revised FIDMS.

| Current FIDMS objectives | | Recommended objectives for revised strategy | |
|--------------------------|---|---|---|
| 1 | Ensure the conservation of a sustainable wild dingo population on Fraser Island. | 1 | Ensure the conservation of a sustainable wild dingo population on Fraser Island. |
| - | (new objective recommended) | 2 | Ensure best practice animal welfare and ethical standards and practices are maintained. |
| 2 | Reduce the risk posed to humans by dingoes on Fraser Island to an acceptable (low) level. | 3 | Reduce the risk posed to humans by dingoes on Fraser Island to an acceptable (low) level. |
| 3 | Reduce the frequency and intensity of aggressive and destructive behaviour by the Island dingoes towards visitors and local residents to the greatest extent practicable. | 4 | Reduce the frequency and intensity of aggressive and destructive behaviour by the Island dingoes towards visitors and local residents to the greatest extent practicable. |
| 4 | Reduce, and eventually eliminate, the incidence of deliberate and inadvertent | 5 | Reduce, and eventually eliminate, the incidence of deliberate and inadvertent |

| Current FIDMS objectives | | Recommended objectives for revised strategy | |
|--------------------------|---|---|--|
| | dingo-feeding by visitors, residents and resort and island staff, and the availability of other sources of human food. | | dingo-feeding by visitors, residents and resort and island staff, and the availability of other sources of human food. |
| 5 | Provide Fraser Island visitors with a safe, enjoyable opportunity to view dingoes in an environment as near as possible to their natural state. | 6 | Provide Fraser Island visitors with a safe, enjoyable opportunity to view dingoes in their natural state. |
| - | (new objective recommended) | 7 | Build community understanding and acceptance of the FIDMS. |

Table 7 Current and recommended revised strategies for a revised FIDMS.

| Current FIDMS strategies | | Recommended strategies for revised strategy | |
|--------------------------|--|---|--|
| 1 | Comprehensive scientific research and monitoring will be undertaken to ensure the principles and practices of dingo management are sound. | 1 | Comprehensive scientific research and monitoring will be undertaken to ensure the principles and practices of the FIDMS are sound. |
| 2 | Awareness programs will continue to encourage appropriate behaviour towards dingoes by island visitors, residents and staff. | 2 | Education and community engagement programs will continue to encourage appropriate behaviour in relation to dingoes by island visitors, residents and staff. Enforcement will continue to discourage prohibited behaviour, such as intentional or inadvertent feeding. |
| 3 | The human-dingo 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. | 3 | The human-dingo interaction will be managed by increasing island-wide facilities and services that discourage dingoes from interacting with people and obtaining human food. |
| 4 | Programs will be implemented to modify dingo behaviour and habits that threaten human safety and wellbeing. | 4 | Programs will be implemented to modify dingo behaviour and habits that threaten human safety and wellbeing. |
| 5 | Any dingo identified as dangerous will be destroyed humanely using accepted methods after receiving appropriate approvals. | 5 | Any dingo identified as dangerous will be destroyed humanely using accepted methods after receiving appropriate approvals. |
| 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. | - | (delete) |
| - | (new strategy recommended) | 6 | A stakeholder group specific to Fraser Island dingo management will be developed to allow regular two-way communication, transparency, input and acceptance of the program. |
| 7 | An ongoing program of monitoring and review will be conducted to assess risk levels | 7 | An ongoing program of monitoring and evaluation will be conducted to assess risk |

| Current FIDMS strategies | | Recommended strategies for revised strategy | |
|--------------------------|---|---|--|
| | at key visitor nodes across the Island and determine the effectiveness of dingo management strategies in maintaining these levels at an acceptable (low) level. | | 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. |

4.3 Effective implementation

The following are general recommendations, in addition to those provided in Section 4.7, that aim to maintain and improve effective implementation of the FIDMS:

- Increase resource allocation to allow implementation, data collection and monitoring of the FIDMS.
- Review staffing arrangements, including remuneration, to ensure service delivery can be maintained to a high standard.
- Address legislative anomalies regarding dingo status. This may include an exclusion of dingoes on Fraser Island as a declared pest in the Land Protection Act. This will assist QPWS managing across all land tenures on the Island, and ensure that such discrepancies would not influence enforcement outcomes. The relevance of the Native Title Act and interaction between other legislation also requires further investigation.
- Improve field data capture techniques, such as tablet computers or PDAs, and associated user-friendly data entry software, should be utilised to expedite electronic data capture to streamline the entire reporting and analysis process. Cost benefit analysis should consider savings associated reduced data entry, more reliable and consistent data, and timely and reliable analysis.
- Engage volunteers as much as possible for selected activities (i.e. scat collection, visitor briefings, etc.) to improve efficacy, cost effectiveness and overall outcomes of the program.
- Consider a small visitation fee (i.e. \$5-10/visitor) to address resource constraints. This would provide additional funding for conservation, increase awareness of management issues and encourage appropriate behaviour. It will also overcome the current issues with collection and collation of accurate visitor data.

4.4 Strategic research plan

As specified in the recommended revised strategy actions table (Section 4.7), the development of a strategic research plan is of high priority. The plan should be developed in consultation with QPWS, particularly to identify research questions that require investigation, and with input from a scientific advisory committee.

Research topics that should be considered for inclusion in this plan are prioritised in Table 8.

Table 8 Recommended topics for consideration in development of the strategic research plan. High (H) priorities should have resources made available as soon as possible; medium (M) priorities should have resources made available in the medium-long term; and low (L) priorities should be implemented when resources are available.

| Research Topic | Priority |
|--|----------|
| <p>Determine an accurate population estimate and a method for efficient, cost-effective regular monitoring of relative abundance.</p> <ul style="list-style-type: none"> Acquisition of the initial population estimate is recommended through DNA profiling where DNA samples should be obtained from dingoes to identify the minimum number of individual dingoes known to be alive during a defined period, and to identify relatedness between individuals and groups Effective ongoing relative abundance monitoring is likely achievable through minor adjustments to data collection and analysis practices (i.e. recording trap effort, strategic camera deployment etc.). | H |
| <p>Determine and monitor population age structure and breeding status through analysis of research data and data from dingo management records.</p> <ul style="list-style-type: none"> To facilitate this from current practices, trapping effort and GPS locations of all captures should be recorded, along with data on age, sex and lactation status for all trapped dingoes to identify changes in sex ratios over time. | H |
| <p>Diet and foraging ecology including seasonal and spatial variation, the effects of dingoes on prey species, and dingo health and body condition relative to these.</p> <ul style="list-style-type: none"> This should include continued scat collection and analysis projects, with incidental collection by QPWS staff and through targeted surveys by volunteers or as components of relevant research. Longitudinal studies looking at body condition changes over time, as well as epidemiological studies using biochemical parameters (i.e. breakdown products in faecal samples) should be considered to assess dingo condition and nutrition levels. | H |
| <p>Investigate other non-lethal dingo management techniques (i.e. reversible contraception for habituated females, potential for positive reinforcement techniques not involving food rewards, etc.) and scientific trials where appropriate.</p> <ul style="list-style-type: none"> Investigate strategies used in similar human-wildlife conflict situations should be considered. | H |
| <p>Continued long-term dingo population biology/dynamics project continued to gather basic information on demographics and spatial and temporal components of pack numbers (through DNA sampling), territories and intra- and inter-pack sociality (through GPS collaring and tracking).</p> <ul style="list-style-type: none"> This should include dispersal; and genetic relatedness between packs and nearby mainland dingoes. | M |
| <p>Spatial and temporal analysis of incidents and dingo activity to identify trends, and inform management on potential for seasonal closures as a conservation measure and to reduce human risk.</p> <ul style="list-style-type: none"> Spatial analysis of incidents against management actions (i.e. fencing) would also help confirm their efficacy, and whether it reduces incidents or causes them to increase in other areas. Recording a GPS point with each dingo incident reported is critical to achieving this. | M |
| <p>Evaluate the effectiveness of aversive conditioning through experimental trials to determine potential application to the program, including detailed investigation into potential welfare impacts.</p> | M |
| <p>Further investigate human-dingo behaviour and interactions, including causes and drivers of incidents.</p> <ul style="list-style-type: none"> This should be used to inform the attraction-habituation-aggression model and educational messages regarding how people should behave in relation to dingoes. | M |
| <p>Determine the impacts of key educational delivery variables on the effectiveness of education in reaching audiences and influencing knowledge and behaviour, in order to inform cost efficiency and improve effectiveness of the education strategy.</p> | M |

| Research Topic | Priority |
|---|----------|
| Determine the impacts of key enforcement delivery variables on the effectiveness of enforcement in influencing behaviour, in order to inform cost efficiency and improve effectiveness of enforcement activities. | M |
| Calculate the minimum viable population to enable modelling of varying management pressures to determine potential impacts. <ul style="list-style-type: none"> Identification of a single abundance 'number' must be used with caution for dingoes given their robust nature and high level of natural seasonal variation. Ongoing monitoring should focus on population trends (i.e. demographics, overall changes, etc). | M |
| Ethical research into dingo management strategies including consideration into the development of ethical matrices. | M |
| Continue to explore alternatives to the current dingo identification system. | M |
| Social research to determine the level of risk that visitors are willing to accept to inform, with consideration to legal obligations, the level management required. | L |
| Develop a dingo disease monitoring program and determine the prevalence of, and mitigation methods to minimise, threats. | L |

It is recognised that an individual topic above may require several separate projects. As such, the design of such studies should be done harmoniously with each other.

A focus of any research should be to interfere with wildlife as little as possible to obtain the desired answers. Non-invasive methods (i.e. sand plots, camera trapping, DNA sampling through roll or lick blocks, scat analysis, etc) should be selected in preference of those requiring direct interference with an individual where possible.

Key objectives of the research plan should to ensure relevant research is collated, comparatively analysed and provided in a way that can be meaningfully fed back into management programs in a timely manner.

4.5 Communication plan

As detailed in Section 4.7, it is recommended that current planning documents be rationalised into an updated communication plan (to include elements of community engagement that relate to education). Priorities to consider fall under two main categories as shown in Table 9. In addition, actions not covered below that are recommended for continued implementation in Appendix 20 need to be included in the new communication plan.

Table 9 Recommended topics for consideration in the development of a revised communication plan. High (H) priorities should have resources made available as soon as possible; medium (M) priorities should have resources made available in the medium-long term; and low (L) priorities should be implemented when resources are available.

| Topic | Priority |
|--|----------|
| Production and delivery of educational materials and activities | |
| Maintain the existing range of educational materials and activities, and continue to conduct intensive campaigns occurring at high risk periods. | H |

| Topic | Priority |
|--|----------|
| <p>Increase distribution efforts to audience groups that are not being effectively reached and to increase the number of visitors receiving pre-visit exposure to dingo safety information. Priorities for consideration are:</p> <ul style="list-style-type: none"> • Provide additional dingo safe education to all people travelling to Fraser Island by barge. Consider in particular the installation of interpretive panels at the departure kiosk, face-to-face delivery during seasonal campaigns (either by rangers or outsourced) at the departure area and/or on the barge, provision of dingo brochures or flyers to all visitors during seasonal campaigns, and development of a Smartphone Application to which visitors are directed. • Mail or email pre-visit information; include dingo safe information, for all phone and online bookings. • Develop a simple flyer containing dingo safe messages in multiple languages, and provide this through permit packs and distribution to tour operators and accommodation providers. • Intensify efforts to ensure that all commercial tour operators and accommodation providers deliver dingo safety messages to their guests. This should involve a combination of: training (including exploring development of computer-based training, available by DVD or online), informal engagement, provision of brochures for all guests, including enforceable requirements for dingo safety education in all new or updated commercial activity agreements/permits, increased monitoring of compliance (including occasional covert operations, if needed). The emphasis should be on co-operative engagement of mutual benefit to QPWS and commercial operators. • Increase the distribution of the 'Dingoes of Fraser Island – safety and information guide'. • Ensure that during their camper briefings, rangers explore whether campers have received dingo information, and make brochures or flyers readily available to those who indicate they still require information. • Increase the distribution of the 'Great Sandy National Park' DVD. • Develop interpretation panels at Central Station that facilitate group education sessions by tour leaders. | H |
| Ensure continued production of brochures containing dingo-safe messages. | H |
| Optimise use of relatively low cost educational options e.g. brochures, website. | H |
| Develop and promote use of a smartphone application for Fraser Island visitors that includes brief dingo safety messages. | M |
| Pursue social media opportunities, with a focus on monitoring of social media and providing timely input regarding dingo management issues. | M |
| Continue to develop and improve the QPWS Fraser Island website in relation to provision of information relating to dingoes. | M |
| Encourage positive relationship with media personnel through delegation to regional level. | M |
| Promote 'good news stories' in relevant media. | M |
| Install a visitor information centre at Central Station to reach more visitors and increase quality of interpretation of WHA and/or consider provision of interpretation into mainland visitor centres. | M |
| Explore measures and barriers to increase delivery of dingo safe messages and materials by commercial tour operators. Consider: accreditation, ranger presence/briefings to tour groups, inclusion of dingo education requirements in commercial agreements. | L |
| Educational messages | |
| <p>Systematically reassess all dingo messages in terms of their evidence base, through consideration of findings of this report and consultation within QPWS.</p> <p>In particular, reassess messages regarding:</p> <ul style="list-style-type: none"> • how people should behave if a dingo approaches • interpretation of dingo behaviour towards people | H |

| Topic | Priority |
|--|----------|
| <ul style="list-style-type: none"> the link between feeding and aggression ages of children who are vulnerable to attack by dingoes whether the appropriate balance between fear and respect/appreciation for dingoes is created by existing interpretation (this requires consideration of international experience and best practice) whether messages regarding penalties could be more prominently or effectively promoted whether messages regarding how to deal with rubbish could be more prominently or effectively promoted adding further explanation to messages advising visitors to report dingo incidents. <p>Ensure that all messages are soundly based on the best available evidence, bearing in mind that where human safety is concerned, anecdotal evidence may be the best that is available.</p> | |
| Systematically develop and focus on disseminating messages to address key knowledge gaps and misconceptions, as identified in this report and previous reviews of the education strategy, where still applicable. | H |
| Ensure all messages are communicated consistently, leaving room for flexibility in emphasis and style of delivery to suit the audience concerned. | H |
| <p>Consider developing new messages to:</p> <ul style="list-style-type: none"> manage expectations of visitors with regard to likelihood of seeing dingoes (framing this within the context of appreciating their 'naturalness') encourage people to take more personal responsibility for their own safety, the broader context of risks other than dingoes, and to convey that everyone is at potential risk promote appreciation of the dingo as a wild native animal, with a role in the ecological community provide simple information on dingo behaviour and the appropriate way to react to different behaviour explain Fraser Island dingo management, with a focus on countering any public misconceptions. | M |

4.6 Stakeholder committee

A key action under recommended additional Strategy 6 (A stakeholder group specific to Fraser Island dingo management will be developed to allow regular two-way communication, transparency, input and acceptance of the program), as listed in Table 10, is to form a stakeholder committee to consult specifically regarding the implementation of the FIDMS.

Representation should be specified and include Traditional Owners and relevant stakeholders such as government agencies, scientific experts (including an animal behaviourist), conservation groups, welfare organisations, researchers, representatives from the tourism industry and residents. The effective operation of such a group and proactive engagement will contribute significantly to achieving a collaborative and cooperative approach to management. A clear Terms of Reference (TOR) would be required to ensure clarity in the role and contribution from members.

Government funding should be explored, including options to provide support to facilitate stakeholder involvement where appropriate.

4.6.1 Terms of Reference

The purpose of this stakeholder committee would be to provide a regular forum for information sharing, and to allow stakeholders a regular opportunity to assist the implementation of the FIDMS.

There is likely to be some overlap with the FIWHA Committees, which should be limited as much as possible. There is also expected to be significant overlap with the current Fraser Island Dingo Working Group, and clear roles of each should be determined to assess whether consolidation is appropriate. Effective methods of aligning and communicating between committees must also be determined.

A clear TOR should be independently developed in consultation with QPWS (as charged as responsible for dingo conservation and management on Fraser Island) to ensure clarity for all members. Members need to agree to such TOR, with suggested revisions incorporated at QPWS discretion. For consideration in developing TOR are as follows:

- Purpose – clear purpose and objectives of the committee, such as those mentioned above.
- Roles and responsibilities – roles, responsibilities and scope of input to be clearly defined.
- Membership - number of representatives from each group (equal representation between organisations and general interest groups to be encouraged) and methods of joining the committee (i.e. open merit process based on knowledge, skills and expertise).
- Timing of meetings – meetings should be regularly scheduled and arranged so that rescheduling is minimal (i.e. quarterly).
- Mutual agreements – for example, provided transparency in the program (to be defined), members of the committee may agree that requests for information will not be confined to scheduled meeting times.

A regular forum for information sharing and consultation will create transparency in the program, improve stakeholder relations, add valuable input to the program, encourage acceptance and support of the FIDMS and potentially reduce the number of RTI requests and associated time to respond.

4.7 Recommended actions

It is recommended that all actions in the current FIDMS be replaced by Table 10, which provides consolidated, prioritised and measurable actions. The above sections should also be considered, including in the development of the Strategic Research and Communication plans as recommended below.

Table 10 Recommended revised actions table. High (H) priorities should have resources made available as soon as possible; medium (M) priorities should have resources made available in the medium-long term; and low (L) priorities should be implemented when resources are available.

| Theme | Strategy | Action | Priority | Indicator (s) and targets |
|-------------------------|---|---|----------|--|
| RESEARCH AND MONITORING | 1. Comprehensive scientific research and monitoring will be undertaken to ensure the principles and practices of the FIDMS are sound. | Develop a Strategic Research Plan to direct research projects towards issues of relevance to dingo management - Identify priority research projects including funding options and methods, set timeframes, make the plan publicly available and engage researchers. All research projects should include production of a report which contains clear recommendations to inform managers. Comparative analysis with other relevant data should be a requirement of research projects. Partnerships with independent research organisations will assist in ensuring delivery of scientific outputs. | H | A strategic research plan is publicly available by June 2013. |
| | | Ensure research is completed, peer-reviewed with a scientific report generated (and preferably published or made available to the public) and incorporated into management strategies in a timely manner. This should include synthesis and collation of available data. | H | Research data analysed and a scientific report generated (preferably peer-reviewed/published) with results integrated between projects within 12 months of project completion. |
| | | Utilise camera trapping as much as possible to monitor dingoes across the island as an effective and efficient method of obtaining data on relative population size and movement, with data interpreted and incorporated into an electronic database suitable for analysis. Camera trapping methods to be evaluated by suitable experts (i.e. through the Scientific Advisory Committee/Dingo Working Group) to determine the most efficient use of this technique into the future. | H | Camera monitoring protocol developed by June 2013. |
| | | Duplicate hair and tissue samples from all trapped or deceased dingoes collected, stored and analysed. DNA samples collected from live animals using non-invasive techniques (i.e. roll stations, lick blocks) to provide for DNA profiling of all individuals. | H | DNA profiles available for all live dingoes (ongoing). Hair and tissue samples permanently stored for all dingoes (ongoing). |
| | | Improve procedures for collecting and recording information to inform adaptive management, enhance accountability and transparency, and facilitate evaluation (internal and external). This should include more detailed information and consistency in current data collection. | H | Additional data from management activities including visitor numbers, sampling effort (e.g. briefings, trap-nights, etc), exact dates of management activities, infringement records and coordinates for any location-based record to allow spatial analysis available from June 2013. |

| Theme | Strategy | Action | Priority | Indicator (s) and targets |
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| MANAGING PEOPLE | | Collected and autopsy all dingo carcasses to monitor physical condition, cause of death, diet, parasite loads, age etc. QPWS should approach external parties to take responsibility for arranging collection and processing of deceased dingoes for autopsy. Autopsies should include gut content analysis and skulls should be measured and stored. Potential for preservation of reproductive material should be investigated to provide a genetic bank. | H | Autopsy reports on all deceased dingoes available electronically commencing June 2013. Options to preserve reproductive material from deceased dingoes investigated by June 2013. |
| | | QPWS staff involved in dingo management will continue to be trained through regularly evaluated and updated programs in: <ul style="list-style-type: none"> • dingo identification (including recognition of basic features such as sex, age/size, scars and other distinguishing marks) • incident reporting and related matters • dingo behaviour and its correct interpretation • trapping and handling dingoes (including completion of a nationally recognised course) • effectively and confidently conducting enforcement • basic animal assessment and care. Resort staff and island residents will be encouraged to participate in training as necessary on an ongoing basis. | H | Formal training program (including accredited external programs) developed for all relevant QPWS staff by June 2013. |
| | | Transfer all QPWS data (i.e. ear tag register, incident, humane destruction) into a centralised and compatible database. | M | Centralised database in use by December 2013. |
| | 2. Education and community engagement programs will continue to encourage appropriate behaviour in relation to dingoes by island visitors, residents and staff. Enforcement will continue to | Continue to produce and disseminate high quality interpretation products, following guidelines in the communication plan and to support implementation of the FIDMS, and update these on a regular basis. Ensure that all audience groups receive audience-appropriate information. Maximise delivery of pre-visit information to all audience groups. | H | A listing or spreadsheet of all education products and activities is produced internally and updated on an annual basis, and made available to interested parties. This includes information on distribution, target audiences and messages and changes that have been made. |
| | | Continue and increase community engagement in relation to dingo safety messages, using a variety of means, and guided by the new communication plan. | H | A listing or spreadsheet of community engagement activities is produced internally and updated on an annual basis, and made available to interested parties. This includes information on distribution, audiences and messages or themes. |

| Theme | Strategy | Action | Priority | Indicator (s) and targets |
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| | discourage prohibited behaviour, such as intentional or inadvertent feeding. | Ensure that dingo education messages are kept up to date, accurate and relevant to management through ongoing liaison with QPWS dingo management staff, researchers, and stakeholders, as well as through consideration of relevant literature. | H | A listing or spreadsheet of messages is produced internally and updated on an annual basis, and made available to interested parties. This includes information on source of information or evidence for the message and changes that have been made. The communication plan is updated at least every two years with regard to messages. |
| | | Continue public contact by rangers as a major component of the education strategy. Maintain or increase staff resources devoted to public contact, and investigate new sources of funding for this. Seasonal campaigns involving intensive education and enforcement activities during high risk periods will continue. | H | Internal records are kept of staff resources and time devoted to formal public contact. These records indicate that resources have been maintained or preferably increased. |
| | | Develop a revised and detailed communication plan to guide public education and community engagement activities. This plan must be consistent with and refer to the FIDMS. It needs to be approved only at regional level to facilitate timely approval and implementation, and should be updated at least every two years to accommodate new information and issues that may arise. The new plan should be based on the 2004 Communication plan, and include all its existing sections and information, updated where new information is available. To this should be added: Recommendations relating to planning included in the 2004 Communication Plan report (including development of a hierarchy of objectives that link communications-specific objectives to the overall objectives of the FIDMS, and development of objective performance indicators and a plan for monitoring these). Plans to implement recommendations contained in the present review. | M | Revised communication plan written and approved by December 2013 and updated at least every two years. |

| Theme | Strategy | Action | Priority | Indicator (s) and targets |
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| | | <p>Conduct periodic and ongoing monitoring and evaluation of the effectiveness of the education strategy. This should include:</p> <ul style="list-style-type: none"> conducting a visitor survey at least once every five years or just prior to all reviews of the FIDMS (whichever comes first), with the 2012 visitor survey as a basis, deleting several poorly worded questions but maintaining most questions to facilitate comparison over time interviewing or surveying residents and commercial tourism providers in conjunction with the visitor survey encouraging external research to experimentally evaluate the effects of important changes in content or distribution of interpretation ongoing internal monitoring and evaluation using simple performance indicators to be included in the new communication plan. | M | Reports on visitor surveys and feedback from residents and tour operators at least once every five years. |
| | | <p>Develop an internal compliance plan or strategy document to further guide enforcement activities to support the FIDMS. This should include consideration of best practice approaches for comparable situations involving management of protected areas and dangerous wildlife, and plans to implement recommendations of the present review. This plan need only be approved at regional level, to facilitate timely adoption and regular updates as needed. It should also include investigation of the possibility of periodic use of external staff focused purely on enforcement. This plan should also consider methods to address anomalies within current legislation.</p> | H | Compliance plan or strategy written and approved by December 2013. |
| | | <p>Continue and intensify enforcement activities to encourage public compliance with legislation relevant to dingo safety, and guided by the new compliance plan when it becomes available.</p> | H | Records are kept of issue of infringement notices and written warnings, simple indicators of incidents of non-compliance, and effort devoted to monitoring for compliance. |

| Theme | Strategy | Action | Priority | Indicator (s) and targets |
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| | | <p>Conduct periodic and ongoing monitoring and evaluation of the effectiveness of enforcement activities. This should include:</p> <ul style="list-style-type: none"> • questions in the visitor survey regarding public awareness, perceptions and attitudes regarding penalties • questions on enforcement and compliance included in periodic interviews or surveys of residents and commercial tour operators • encouraging external research to experimentally evaluate the effects of important changes in enforcement activities • ongoing internal monitoring and evaluation using simple indicators of non-compliance, as well as recording of monitoring effort. <p>This should be linked to increased and improved record-keeping of enforcement and compliance-related data, including ensuring standardised data entry.</p> | M | <p>Questions on enforcement are included in periodic visitor surveys and interviews/surveys of residents and commercial tour operators. Updates of the compliance plan demonstrate consideration of these results.</p> |
| | | Investigate the possibility of introducing contractual agreements between QPWS and visitors, and mandatory knowledge tests for visitors prior to entry. | M | Feasibility report on additional measures to improve compliance by December 2013. |
| | | Investigate the possibility of legislative changes to allow for prosecution of people who are negligent about the safety of children in areas inhabited by dangerous animals, and other inappropriate behaviour. | M | Results of investigation (and plan to implement if appropriate) available by June 2014. |
| | | Implement an intensive compliance program for deliberate feeding and possibly for other inappropriate behaviour. This should include the increased use of camera surveillance as required. | H | Records of intensive compliance up to date and analysed against incidents as part of the quarterly risk assessment report. |

| Theme | Strategy | Action | Priority | Indicator (s) and targets |
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| MANAGING PEOPLE | 3. The human-dingo interaction will be managed by increasing island-wide facilities and services that discourage dingoes from interacting with people and obtaining human food. | Investigate the option of captive Fraser Island dingoes on Fraser Island or the mainland to safe guard the genetic population (i.e. against a stochastic event) and promote understanding and support of dingoes. Issues requiring investigation include: <ul style="list-style-type: none"> · source of dingoes, including welfare implications if wild bred. · land tenure and use · potential to set unwanted precedent · potential to encourage visitors to similarly interact with wild dingoes. Assessment against encouraging visitation to current establishments already housing dingoes is required. | L | Options of including captive dingo viewing and education investigated by December 2015. |
| | | Continue fencing of high risk sites. Provide alternative fenced camping areas for use by tag-along tour groups as a priority. Commercial tour groups in general should be phased towards camping only within fenced areas, with location and design of these campsites planned in close consultation with operators to address their needs as far as possible. The need to restrict all camping to fenced areas should be evaluated using spatial data. Appropriate fence design, gates and construction materials will continue to be field tested to ensure they are effective, and sympathetic to wildlife movement and stakeholder needs. Consideration should be given to additional engineering improvements which can eliminate the occurrence of open gates. | H | Barrier fences erected at high risk sites. Consult with tour operators and investigate options for commercial tour groups to camp only within fenced areas by December 2013. Spatial analysis of incident data against fencing included in the Strategic Research Strategy. Potential and implemented improvements to fence design reported in quarterly risk assessment reports. |
| | | Regularly audit all unfenced day use areas and camping grounds to determine which sites require improvements to facilities. Sites identified as high risk in the risk assessments will also be systematically audited. Fences will be checked at least monthly. Additional temporary facilities at high use times (i.e. fish cleaning stations during peak season) should be provided as required. | H | Include audit results and recommend facility improvements (where required) in quarterly risk assessment reports. |
| | | Ensure appropriate facilities are in place to address dingo management issues for all new developments for day use and camping areas will. | H | New development plans to have appropriate facilities before approval. |

| Theme | Strategy | Action | Priority | Indicator (s) and targets |
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| MANAGING DINGOES | | Continue permanent or temporary closure of certain campgrounds will according to the recommendations of the Camping Management Plan and as risk assessments determine. Appropriate level staff should be appointed to approve to facilitate timely implementation as required. Restrict visitor access to key dingo habitat or during certain seasons if research shows that conservation and/or risk management outcomes would be improved. | H | Protocols developed for temporary campground closure and appropriate staff level appointment by June 2013. Investigations into seasonal or permanent visitor access restrictions commenced by December 2013. |
| | | Provide trailers with full-size portable toilets near tag-along tour sites for as long as these sites remain unfenced. Negotiate with tour operators and explore options for funding. | H | All Tag-along Tour sites have suitable toilet facilities by December 2013. |
| | | Consider a small visitation fee for all visitors to support conservation and management, and provide a ready source to overcome current issues on visitor data. Resistance is likely from some sectors and should be considered as part of the feasibility study. | H | Feasibility study for a visitation fee should be completed by June 2013. |
| | | Officially acknowledge the suspension of hazing until such time where a research trial demonstrates its efficacy for conditioning dingoes, and investigation of potential welfare and behavioural impacts. If welfare hazing trials are successful, this method may be reinstated. | H | Hazing immediately officially suspended with trials investigated as part of the strategic research plan. |
| | 4. Programs will be implemented to modify dingo behaviour and habits that threaten human safety and wellbeing. | Make improvements in efficiency to the trapping program as detailed in this report. Continue the current method of ear tagging unless a suitable alternative can be identified through ongoing trials. A 10kg weight minimum and body condition scores should be used as minimum standards for tagging. | H | Improvements immediately made to the trapping and tagging program, and appropriate accredited training incorporated into training program. Dingo weights and body condition recorded in ear tag register to continue for every individual. |
| | | Continue research trials of non-lethal management measures and incorporate into the program where appropriate. | M | Ongoing research continuing. |
| | | Ensure provisions are made for veterinary care required as a consequence of human interference, with allowances for a qualified vet to travel to the island as required. | H | All dingoes receive appropriate veterinary care as required as a result of human interference commencing immediately. |
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| Theme | Strategy | Action | Priority | Indicator (s) and targets |
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| MANAGING DINGOES | 5. Any dingo identified as dangerous will be destroyed humanely using accepted methods after receiving appropriate approvals. | Guidelines for assessing the risk posed by dangerous and problem dingoes (including incident recording) based on an individual's level of aggression and habituation regularly internally reviewed, and periodically independently reviewed, to ensure a uniform response to such animals. This should include review of outputs to ensure consistency of interpretation and assessment. | H | Guidelines and outputs reviewed internally every 3 months and independently (i.e. Scientific Advisory Committee) annually. Evidence of appropriate training to ensure consistent recording and response to incidents. Recorded responses deemed to be consistent at reviews. |
| | | 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. The decision to destroy a dingo should continue to be on the basis of Code D and E incidents, and no individual should be destroyed for Code C behaviour. Consider renaming Code A and B incidents as 'sightings' to more accurately reflect these records. | H | Evidence of confirmed identification and documented behaviour history for all destruction records. |
| | | 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. | H | Humane destruction database maintained and up to date, and included in population dynamics research/analysis. |
| | | 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. Protocols and destruction records should be periodically reviewed by relevant independent experts (i.e. RSPCA, veterinarians). | H | Protocol for humane destruction developed in consultation with RSPCA and veterinarians, and in place. Evidence of suitable training for staff approved in humane destruction. Relevant experts invited to audit protocols and records as required. |
| | | Develop a stakeholder committee with clear TOR to improve stakeholder consultation, transparency in the program, and to seek input as required. | H | Stakeholder committee formed by December 2013 and meeting at least bi-annually. |
| STAKEHOLDER CONSULTATION | 6. A stakeholder group specific to Fraser Island dingo management will be developed to | Consult with international experts to obtain up-to-date information and advice on best practice management of dangerous wildlife situations. | M | Ongoing as part of the stakeholder committee. |

| Theme | Strategy | Action | Priority | Indicator (s) and targets |
|-------------------------|--|---|----------|--|
| RESEARCH AND MONITORING | allow regular two-way communication, transparency, input and acceptance of the program. | Periodically review methods by relevant experts facilitated through the stakeholder committee. | M | Scheduled in consultation with the stakeholder committee. |
| | | Encourage endorsement of the FIDMS by various stakeholders and include endorsed groups on the FIDMS. | M | Consider including endorsement for the revised 2013 FIDMS. |
| | | Encourage further co-operative management (including cost sharing) and enforcement arrangements across all tenures through participation by relevant stakeholders in the stakeholder committee. | M | Ongoing as part of the stakeholder committee. |
| | | Provide transparency in FIDMS implementation with Standard Operating Procedures on QPWS website or included into the FIDMS to make a living document. Would need to be developed in consultation with QPWS, and highlighted that they are evolving and adaptive. | M | Standard methods to be available online by December 2013. |
| | 7. An ongoing program of monitoring and evaluation 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. | Risk levels and factors (i.e. changes in visitor pressure) 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. Subjectivity will be limited by ensuring at least three QPWS staff members agree on assigned risk consistent with current practices. Reporting on implementation of dingo management strategies will also occur within quarterly reports. Further investigate improving risk assessments as a predictive management tool through additional data analysis. Review sites to streamline assessments and correctly define their use. | H | Improvements made to the quarterly risk assessment and clearly articulated through policy/procedure to streamline and allow a more effective predictive assessment by June 2013. |
| | | 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. | H | Major independent review of the management program every three years. |
| | | 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. | M | Dingo management and conservation implications considered as part of the next Sustainable Visitor Capacity review due to commence May 2013. |
| | | Risk calculator variables and risk assessment methods should be regularly reviewed to confirm their validity. | M | Risk calculator variables reviewed at least during each full FIDMS review every three years. |
| | | Integrate best practice monitoring and evaluation in a revised FIDMS. | M | Revised FIDMS includes monitoring and evaluation by December 2015. |

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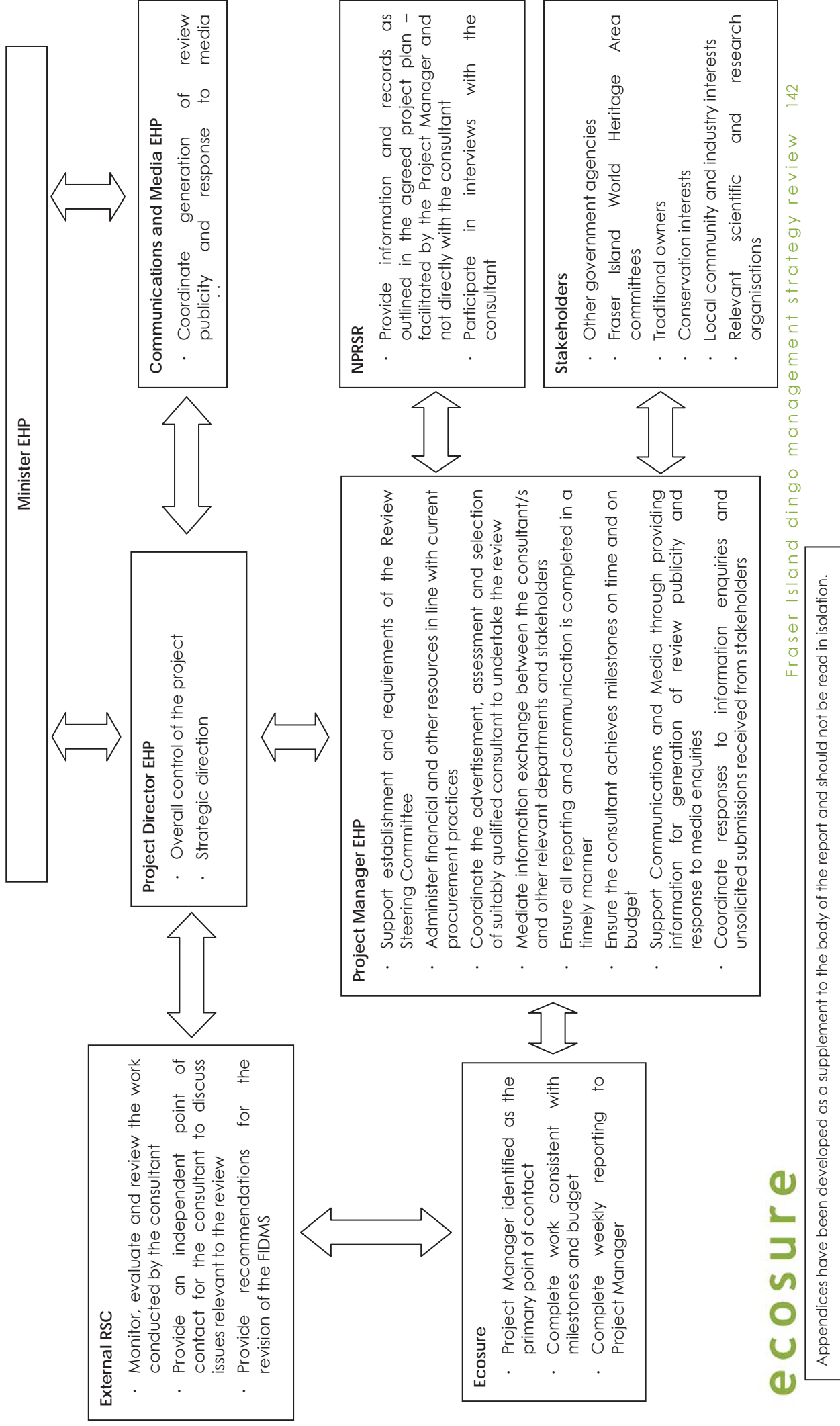
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Appendix 1 Review governance model (source: EHP)



Appendix 2

Review terms of reference (source: EHP)

Department of Environment and Heritage Protection REVIEW OF THE FRASER ISLAND DINGO MANAGEMENT STRATEGY TERMS OF REFERENCE

Purpose of the review:

Conduct an objective and independent scientific review of the Fraser Island Dingo Management Strategy 2006 (FIDMS) and provide recommendations that will improve the strategy in relation to managing risk and visitor safety and maintaining a sustainable wild dingo population on the island.

Required outcomes:

- Evaluate and report on the effectiveness of the FIDMS in relation to risk management, visitor safety and maintaining a sustainable wild dingo population.
- Conduct an audit of the actions (outputs and outcomes) under the current FIDMS.
- Investigate alternative proposals and options and provide a comparison against the FIDMS actions in relation to potential outcomes.
- Recommend actions for inclusion in a revised FIDMS.

Scope of work includes:

Implementation

- Assess the impacts of engineering solutions on all aspects of dingo management with a specific case study on the results of fencing infrastructure.
- Assess enforcement activities of the Queensland Parks and Wildlife Service (QPWS) with a specific case study on the accountability of external parties (e.g. Commercial Tour Operators, public,) in their obligations when on Fraser Island.
- Assess effectiveness of direct actions regarding dingo behaviour including hazing, and humane destruction protocols.
- Evaluate the effectiveness of the public education strategy including the QPWS Dingo Communications Implementations Schedule 2010 to 2015. Given the emerging use of social networking consider those media for potential use.
- Evaluate the level of implementation of the current FIDMS actions

Information management and reporting

- Assess the Quarterly Fraser Island Dingo Risk Assessments by QPWS Great Sandy Region and consider the suitability of the risk assessment.
- Evaluate dingo management records including incident reports and humane destruction records.
- Evaluate information from relevant research and management actions including the dingo tagging program and the Fraser Island Dingo Population Study 2009 - 2012.
- Consider the audit information from the original FIDMS (2001) and from subsequent audits and evaluations of the strategy and make recommendations on what future audits should contain regarding both the levels of compliance and effectiveness with a revised strategy.

Consultation

- Consult with QPWS executive, Great Sandy Region management and operations staff in relation to the delivery of outcomes under the FIDMS.
- Consult with individuals and groups representing the local community including State and local Government, tourism representatives, Fraser Island residents and special interest groups.
- Consult with relevant scientific and research organisations in relation to dingo ecology and behaviour.

Appendix 3

Management effectiveness evaluation framework

The **IUCN-WCPA management effectiveness evaluation framework** provides a best-practice internationally endorsed framework for evaluating effectiveness of protected area management programs. A key consideration in its development was the need to readily facilitate the process of adaptive management. The framework is widely used internationally by the Global Environment Facility, the World Bank and others and is the most widely applied framework for assessing management of protected areas (M. Hockings, pers. comm., 2012). Systems developed using this framework have now been applied in more than 10000 protected areas worldwide. In Australia, it was used as the basis for developing the State of the Parks reporting systems in NSW, Victoria and Queensland. It was also used to assess management effectiveness in the Great Barrier Reef Outlook Report in 2009 and was integrated into the most recent Australian State of Environment Report. Key references relating to the framework are listed at the end of this appendix.

The framework involves evaluating each of the following 'elements' of the 'management cycle' (since all components of the cycle influence outcomes, and may need to be adjusted in order to achieve those outcomes):

- context – information that helps put management decisions into context (e.g. values, threats, opportunities, legislation, political environment)
- planning – appropriateness of strategies, plans, policies and design
- inputs – adequacy of resources (staff, funds, facilities) employed for management
- processes – adequacy and appropriateness of management systems and actions designed to achieve management objectives
- outputs - services or products resulting from management activity
- outcomes – the degree to which objectives have been achieved.

The following provides further detail on the questions and recommendation topics considered by this review process.

Context

What are the key 'drivers' and context of the FIDMS? i.e. identify what has changed since, or was not sufficiently considered in the 2006 strategy. e.g. legislation, political (including political factors relating to what methods of dingo management would be acceptable), overarching planning documents, history – including recent dingo incidents, understanding of the FI dingo population, any stated targets (e.g. for dingo population or human attacks), new information on dingo population.

Planning

Is the above context adequately reflected in the FIDMS? – especially are the objectives adequate and appropriate?

Is the strategy logically designed to achieve the objectives (assuming methods are effective)?
Is the strategy written in a way that allows for meaningful evaluation of effectiveness? (e.g. are objectives linked to outcomes? Are outputs and outcomes stated in a measurable way, with use of indicators? Are targets or standards specified?

Inputs

Were the resources (staff, \$ etc) adequate to implement the FIDMS?

Processes

Are the management actions in the FIDMS adequate and appropriate? Investigate alternative proposals and options (actions) and provide a comparison against existing FIDMS actions in relation to potential outcomes. Use multi-criteria decision analysis method - weighing up different management actions for achieving each relevant objective.

Are the information management and reporting systems used by QPWS appropriate and adequate (including dingo risk assessments, dingo management records) i.e. do they provide data that can be used to adequately evaluate achievement of outcomes and to provide feedback on effectiveness of management actions.

To what extent have the management actions listed in the FIDMS been implemented? Provide full audit list of actions and extent to which each has been implemented. Where possible identify why actions have not been (fully) implemented.

Outputs

These are not specified in the FIDMS, but are implied by the actions e.g. reports produced, number of dingoes hazed, new funding obtained. As part of the audit of actions above, list any outputs relating to each action, consider extent to which these are adequate and appropriate in contributing to achievement of outcomes, and assess whether reporting of outputs is adequate for this element to be adequately evaluated.

Outcomes

To what extent have the objectives stated in the FIDMS been achieved to date? (In many cases, due to lack of objectively measurable data, this will be limited to qualitative comment, and the extent to which different stakeholders perceive they have been satisfactorily achieved.) Assess factors contributing to incomplete achievement of objectives.

Implications for methods

This framework was used to help inform development of methods, as follows:

- review literature, research data and reports, records – to provide input into all evaluation elements
- consult with key stakeholders – provide additional documentation for all evaluation elements, directly provide information for context (political) element, provide ideas on alternative management actions. use to inform design of interview questions
- site visit
 - fill in gaps in audit of actions – process element
 - collect further information allowing assessment of processes and outcomes
 - obtain any other information identified as a gap during the document review process.

Appendix 4

Communication plan

| Type | Vehicle | Stakeholder Group or Contact | Purpose | Weekly yes | As Req yes (EHP/Ecosure) | Month | | | | | | |
|-------------|--|---|---|---------------|--------------------------------|-------|----|-----|--------------------------|-----------------|------------|--|
| | | | | | | J | A | S | O | N | D | |
| 1 (Key) | Weekly reports; all meetings; general phone/email; progress report; final report | Department of Environment and Heritage Protection | Ensure objectives are met as per brief; regular updates to be kept informed and provide info to stakeholders (media releases); coordinate data requests; to coordinate media interest | | | WR | WR | WR | WR + PR + SW + KSM | PM + FR(dri) | WR + FR | |
| 1 (Key) | Additional initial meeting; key stakeholder meeting; stakeholder workshop (optional); progress meeting | Review Steering Committee | Determine methods and direction of review to align with expectations for final report | | yes (EHP/Ecosure) | | IM | | SW + KSM | PM | FR | |
| 1 (Key) | Site assessment; key stakeholder meeting; stakeholder workshop | Department of National Parks, Recreation, Sport and Racing (incorporating Queensland Parks and Wildlife Service (QPWS)) | Provide data and information for review (EHP coordinating); provide evidence of implementation of strategy actions; site detail and background knowledge; assist development of new actions | | yes (EHP/Ecosure) | | | | SA + SW + KSM | | | |
| 2 (Key) | Key stakeholder meeting; stakeholder workshop | FIWHA Scientific Advisory Committee | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP/Ecosure) | | | | SA + SW + KSM | | | |
| 2 (Key) | Key stakeholder meeting; stakeholder workshop | FIWHA Community Advisory Committee | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP/Ecosure) | | | | SA + SW + KSM | | | |
| 2 (Key) | Key stakeholder meeting; stakeholder workshop | FIWHA Indigenous Advisory Committee | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP/Ecosure) | | | | SA + SW + KSM | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Save Fraser Island Dingoes Inc. | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Hervey Bay MP (Ted Sorensen) | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | During Dingo Sanctuary (Simon Stretton) | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | National Dingo Preservation and Recovery Program | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Dingo Care Network | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Fraser Island Dingo Management Working Group | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Fraser Coast Training and Employment Support Service (TESS) Wildlife Sanctuary (Ray Revill) | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Australian Dingo Conservation Association | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Fraser Coast Regional Council | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Fraser Coast Tourism | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Fraser Island Association | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Griffith Uni | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | RSPCA | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |

| Type | Vehicle | Stakeholder Group or Contact | Purpose | Weekly | As Req | Month | | | | | | |
|----------------|--|---|--|--------|-----------|-------|---|-----|----|---|---|--|
| | | | | | yes (EHP) | J | A | S | O | N | D | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | UQ (+ Fl Dingo Working Group) | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Wilderness Society | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Wildlife Preservation Society of Queensland; Fraser Coast Branch Inc. | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | World Wide Wildlife Fund | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Fl Natural Integrity Alliance (QPWS, Biosecurity Qld) | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 3 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Fraser Island Defenders Organisation | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 4 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Fraser Island Residents | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 4 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Commercial operators (incl. Tim Rivers) | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 4 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Tourism reps | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 4 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Kingfisher Bay resort | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 4 (General) | Stakeholder workshop; Survey monkey (invitation); media releases; contact with EHP if required | Taxi Service | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 5 (General) | Stakeholder workshop; Survey monkey; media releases; contact with EHP if required | Visitors | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |
| 5 (General) | Stakeholder workshop; Survey monkey; media releases; contact with EHP if required | General community | Provide specific additional information (to be considered if within the scope of the review Terms of Reference); provide feedback on current dingo management on Fraser Island | | yes (EHP) | | | SMo | SW | | | |

Appendix 5

Alternative proposals

| Topic | Proposal | Comments | Action required |
|------------------|-----------------------|---|--|
| Managing Dingoes | Supplementary feeding | <ul style="list-style-type: none"> Dingoes across Australia are typically lean and it is normal for some subordinate animals within the pack to be denied resources and potentially starve or die of other natural causes (e.g. Allen 2010; Corbett 2001). Accurate historical population data is not available, but it can be expected that previous populations with access to artificial sources of food would have been in densities higher than the natural carrying capacity. Strategies to reduce the availability of artificial food sources have likely resulted in lower densities of dingoes now more reflective of natural carrying capacity. Artificially sustaining or inflating a population beyond natural carrying capacity by providing resource subsidies typically has detrimental effects on other prey fauna, especially on island populations (e.g. Caughley 1980; Caughley and Sinclair 1994; Krebs 2008). There is no evidence that the extant dingo population is in decline or unsustainable. However, population studies are required to effectively monitor this and inform management decisions. Introducing permanent feed stations will likely alter territory boundaries, pack dynamics and natural population cycles (e.g. Corbett 2001; Fleming et al. 2012; Newsome 2011). Supplementary feeding of any kind will only increase the breeding capacity of the dingo population, and will not eliminate or reduce the number of lean, surplus animals (e.g. Corbett 2001; Krebs 2008). Feral horses have never been reported to be an important food source for dingoes anywhere in Australia (e.g. Allen and Leung 2012; Corbett 2001). Brumbies were removed from the Island in 1992; hence no dingoes in the current population would ever have had access to brumbies anyway. Ethical concerns of introducing live prey to the Island for feeding overabundant dingoes needs to be addressed. Before reintroducing a prey species, an understanding of the initial cause/s for decline is required in order to mitigate those causes (e.g. Allen and Fleming 2012; Fleming et al. 2012a). Feeding of wildlife is associated with increased aggression towards people in a wide range of species (Green and Higginbottom 2001). Provision of food such that dingoes associate this with people greatly increases the likelihood of aggression occurring. Although sometimes fed under previous management circumstances, Traditional Owners and Forestry workers were known to discipline 'camp dogs' and destroy problem animals, much like current management approaches. Similarly, Aboriginal people traditionally competed with dingoes for resources, and were anecdotally reported as having harvested pups for food (e.g. Corbett 2001; Smith and Litchfield 2009). | <p>Population demography studies (including age structure, breeding success, minimum viable population size, accurate population estimates) are required to facilitate effective population monitoring.</p> <p>Regular monitoring of the prey abundance will assist in predicting and managing dingo population and ensuring ecosystem health.</p> |

| Topic | Proposal | Comments | Action required |
|-------|--|--|--|
| | Relocation | <ul style="list-style-type: none"> Relocation to a captive environment has been previously trialled without success, with two of the three that survived the process being euthanised after several years due to depression and aggressive behaviour (QPWS 2006). Aggressive animals are also unlikely suitable for breeding as it has been demonstrated through other canid breeding studies that behaviour is, at least in part, attributable to genetics (e.g. Trut et al. 2004). Therefore breeding aggressive individuals eventually results in a more aggressive animal, which would never be suitable for release. Consideration should also be given to the most appropriate use of finite resources available at such captive centers. However, provided these are considered, the option to further trial relocation of dingoes identified for humane destruction should be investigated. <ul style="list-style-type: none"> Relocation to another part of the Island has also been trialled and found to be unsuitable to manage risk as relocated dingoes either return to the original area or transfer the risk to a different area (QPWS 2006). It is also not appropriate from a welfare perspective, as relocated dingoes would likely be killed by resident pack or displace and kill (or cause the death of) a resident dingo at the release site, as reported in the 2006 FIDMS (QPWS). Relocation of any kind places stress on the animal(s) being relocated, and humane destruction of an aggressive animal is likely more humane than moving a wild animal to a captive environment (e.g. Sharp and Saunders 2011). Captive breeding for release back to the wild is only ever considered pursuant to the Nature Conservation Act 1992 under a captive breeding agreement developed for a threatened species or population (e.g. IUCN SSC 1995; Soarae 2008). Until such population data is available to show that the population is under threat, it is unlikely that a captive breeding agreement would be developed. Suitable methods of effectively monitoring the population over time must be determined as a priority to ensure changes (i.e. decline) in the population are detected. Collecting and storing the reproductive material/organs (e.g. testes and ovaries) of all deceased animals might provide a less problematic solution to preserving the genetics of destroyed dingoes than the capture, transport and housing of a wild animal. | <p>Regular population monitoring using an effective and repeatable method.</p> <p>Collect and preserve reproductive material/organs (e.g. testes and ovaries) of all deceased animals.</p> <p>Investigate further trials into relocation of dingoes identified for humane destruction.</p> |
| | Establish a captive population of Fraser Island dingoes either on the island or nearby mainland to provide visitors opportunity to safely view and learn about | <ul style="list-style-type: none"> There are a number of potential positive outcomes and issues associated with supporting captive Fraser Island dingoes. These are listed below, but require separate investigation by relevant stakeholders. <ul style="list-style-type: none"> Potential positive outcomes: <ul style="list-style-type: none"> assisting to safe guard against stochastic event that may threaten Fraser Island dingoes (although this may be achieved by storing reproductive material) increased understanding and support of dingoes generation of revenue that could be reinvested into dingo conservation. Potential issues: | <p>Investigate the option of captive Fraser Island dingoes on Fraser Island or the mainland and compare with options to visit accredited establishments currently housing dingoes.</p> |

| Topic | Proposal | Comments | Action required |
|-------|---|--|--|
| | Fraser Island dingoes | <ul style="list-style-type: none"> - source of dingoes: Fraser Island pups (welfare implications would require investigation), problem animals (issues as detailed above), assisted reproductive technology (constrained by current technology and cost) - land tenure and use - may set an unwanted precedent - may encourage people to interact in the same way with wild dingoes. - ownership issues. <p>It is already possible to interact with captive dingoes at a number of places within three hours of Fraser Island (e.g. Australia Zoo, Beerwah). Therefore an alternative would be for tour operators to include visits to such locations where tourists can interact with dingoes before heading to Fraser Island. These establishments must be accredited and it is imperative they deliver messages consistent with the FIDMS.</p> | |
| | Reintroduction of mainland dingoes onto the Island | <ul style="list-style-type: none"> • More information on the genetics of Fraser Island dingoes and nearby mainland dingoes is required before considering proposals to release mainland dingoes onto Fraser Island (e.g. Corbett 2008; Baker In prep). • Introducing a new strain/s of pure dingo to provide new genetics is contradictory to conserving the unique genetics of the Fraser Island dingo. • Similar animal welfare issues detailed in the relocation section above are also relevant here. • This proposal partially stems from concern over inbreeding as a symptom of a reduced population. These reports are anecdotal and there is no genetic evidence of sibling mating occurring on the Island, but if it is occurring it could potentially be a sign of: <ul style="list-style-type: none"> - overcompensating for the loss of an alpha animal or other individuals - a normal population response to an increase in rainfall/prey resources - an unnatural response to provision of artificial food sources (i.e. human feeding) - a chance event. <p>Corbett (2001) reports incest to be a common event in a captive pack of dingoes in central Australia (see also Corbett 1988). A family group of 55 different but related individuals was also found around a rubbish dump in the Tanami Desert, suggesting substantial incest in dingo populations subsidized by human-derived food (Newsome 2011). There is little data from anywhere in Australia to indicate whether or not sibling breeding in wild populations is unusual or not besides these studies. However, incest is expected to be common and normal reproductive behavior for dingoes (e.g. Breckwoldt 1998; Corbett 2001).</p> | <p>Further research on the genetics of Fraser Island and nearby mainland dingoes.</p> <p>Population demography studies as above.</p> |
| | Equip rangers to assist sick/injured animals and/or a | <ul style="list-style-type: none"> • Every attempt should be made to capture and treat a dingo that has been injured as a result of human interference (i.e. remove fishing hooks). However, interference with natural morbidity should be avoided. | Senior NRM rangers trained in basic animal health assessment and care. |

| Topic | Proposal | Comments | Action required |
|-------|--|--|---|
| | care facility on the Island | <ul style="list-style-type: none"> Senior NRM Rangers should be trained in basic animal health assessment and care. Few injured dingoes require care, and an on-site care facility is likely cost prohibitive. However, allowances should be made to ensure a suitably qualified veterinarian can travel to the Island if required. | Ensure allowances made for qualified vet to travel to the Island as required. |
| | Align with management of overseas species – wolves, coyotes, bears | <ul style="list-style-type: none"> The strategies and techniques used to manage Fraser Island dingoes are similar to those used to manage similar wildlife-human conflict in other countries. Prohibition of feeding (with associated fines and penalties), aversive conditioning, and humane destruction are all used in other parts of the world (e.g. Baker and Timm 1998; Gerht et al. 2010; Treves and Karanth 2003). It must be noted that while there are many common principles, these are all very different species and dingo-specific management is required (Allen 2012a). For example: <ul style="list-style-type: none"> Playing wolf calls to mimic resident pack – this would attract dingoes, and people use this method to lure canids (not repel them) around the world. Bright 'fladry' tape that flutters in the wind - likely to attract dingoes and commonly used as a lure. Scent marks (urine and faeces) to establish false territories – urine and faeces are commonly used to lure dingoes. However, continued research into common principles and new strategies that may be useful in the FIDMS is recommended. | <p>Continue research into risk mitigation and conservation.</p> <p>Continue to explore strategies used on other species to identify potential new strategies for dingoes.</p> |
| | Remove all dingoes | <ul style="list-style-type: none"> Dingoes are an integral part of the ecological processes present on Fraser Island, and they contribute to a positive visitor experience for many people. Removing all dingoes is not considered an appropriate proposal. | |
| | Fence all dingoes on Fraser Island | <ul style="list-style-type: none"> An alternative would be to fence all people, which would allow dingoes to utilise the Island while reducing the risk to humans. Fencing large areas of habitat to contain dingoes is not appropriate for many reasons, with key issues being that it would: <ul style="list-style-type: none"> -reduce natural habitat and territories and restrict natural habitat use, including key foraging areas such as beaches, which would likely impact the sustainability if the Island population -prevent movement of other wildlife -restrict human access to these areas -be cost prohibitive with installation and ongoing maintenance. | |
| | Vaccinate all dingoes and | <ul style="list-style-type: none"> It is uncertain if dingoes on Fraser Island have ever been challenged with vaccinatable disease such as parvovirus or distemper, which can be found naturally occurring in mainland dingo populations | Research to detect antibodies for vaccinatable |

| Topic | Proposal | Comments | Action required |
|-----------------|---|--|---|
| Managing People | administering antibiotics | <p>(Corbett, 2001). A research project should assess the need before determining if dingoes require vaccinations (i.e. bloods from captured or deceased dingoes tested for antibodies).</p> <ul style="list-style-type: none"> Antibiotics should be administered to dingoes suffering an infection as a result of human interference, as per general veterinary care detailed above. Investigate potential delivery devices and techniques for vaccinating wild dingoes, such as M44 ejectors (e.g. Allen and Gonzalez 2001; Berentsen et al. 2004). | diseases (i.e. rabies, parvovirus, distemper) in Fraser Island dingoes. If vaccinations are required, potential delivery devices and techniques will need to be investigated. |
| | Cease all ear tagging/change tag or identification method | <ul style="list-style-type: none"> The ability to individually identify dingoes is fundamental to effective dingo management on Fraser Island. Accurate identification of dangerous animals prevents the need for a less discriminate cull in response to serious incidents. While identification by markings is often possible (e.g. Elledge et al. 2008), particularly by QPWS staff who are familiar with many of the individuals, ear tagging is required to enable more reliable identification by all staff and visitors. The main issues associated with current tags are that they may cause floppy ears if incorrectly placed, and they can delaminate and/or fade so that identifying colours are not recognisable. Continual review of methods and extensive staff training has resulted in floppy ears becoming extremely rare. Floppy ears are occasionally seen in untagged mainland dingoes (M Goullet 2012, pers comms., 12 Oct), and whether or not the frequency of floppy ears on Fraser Island is higher than normal is unknown. Alternative identification systems have been trialled by QPWS: alternative tag design, including using letter combinations, but these have been too small and difficult to read. Colour marking with dye has also been trialled, but this only lasts a number of weeks which is not sufficient for ongoing monitoring of individuals. Improvements to the current tags are already being investigated to prevent colour fading or delaminating. | <p>Continue to use the current tagging system until such time that an improved system is identified.</p> <p>Continue to investigate and trial alternative identification systems.</p> |
| | Inspection points at barges to limit food dumping and to ensure fauna/flora not being removed | <ul style="list-style-type: none"> Some visitors are known to leave food at barge points before travelling home. Education, enforcement and access restrictions should continue at these areas. This could be supported by camera surveillance or the provision of waste collection facilities. Discussion of inspection points to ensure native flora/fauna are not being removed from the island is beyond the scope of this review. | Education, enforcement and access restrictions at key sites. |
| | Remove all people | <ul style="list-style-type: none"> Fraser Island has permanent and semi-permanent residents, and is an international tourist icon. Removing all people is not considered an appropriate proposal. | |
| | Camera surveillance in enforcement | <ul style="list-style-type: none"> Enforcement may be improved with cameras at 'hot spots', with clear signage of purpose, number plates taken and prosecutions imposed. | Increased use of cameras surveillance in enforcement. |

| Topic | Proposal | Comments | Action required |
|-------|--|--|---|
| | Management focused solely on people | <ul style="list-style-type: none"> A large number of strategies in the FIDMS are already focused on managing people. The management of human risk is a complex and interwoven issue. Regardless of strategies to manage people, compliance will never be 100%, so there is a clear need for a comprehensive management strategy. | |
| | Observation hides built to observe dingoes | <ul style="list-style-type: none"> Dingoes can be readily observed already, and provided appropriate behaviour is maintained, this can be done safely without the need for hides. | |
| | Contractual agreements between visitors and QPWS | <ul style="list-style-type: none"> QPWS have a responsibility to manage risk to protect those entering a national park; however there has been discussion on introducing legislation to enable prosecution of people who are negligent about the safety of children in areas inhabited by dangerous animals. Although this would be difficult to impose and manage, it requires further investigation. The potential for visitors to enter into a contractual agreement to promote awareness and encourage people taking responsibility for their actions should be investigated. This could be combined with a mandatory knowledge test that needs to be passed before entering (this could be a remote log-in test completed with camping permits, or a simple touch screen test on barges/visitor centres with multi-choice answers). | <p>Investigate introducing legislation to enable prosecution of people who are negligent about the safety of children in areas inhabited by dangerous animals.</p> <p>Investigate contractual agreements and mandatory knowledge tests for visitors prior to entry.</p> |
| | Minimum age requirement for children visiting the Island or unfenced areas | <ul style="list-style-type: none"> This is not a practical or feasible management option. It is recommended that encouraging adults to supervise children is more appropriate. | Determine more effective ways to encourage adults to supervise children. |
| | Cap visitor numbers and site restrictions | <ul style="list-style-type: none"> Many sites (i.e. campgrounds) already have visitor caps in place which is regulated through the number of camping permits issued. NRM rangers should be permitted to rapidly close or restrict visitor numbers at high risk areas as required. Where key dingo locations are identified (i.e. den sites), potential seasonal closures should be considered to provide for dingo conservation and to reduce likelihood of associated incidents. Island-wide capping of visitor numbers in relation to dingo management and conservation should be considered as part of the next visitor capacity review. | <p>Allow senior NRM rangers to utilise restrictions and closures of high risk areas as required.</p> <p>Continued research into key dingo locations (i.e. den sites) and spatial analysis against incidents to inform seasonal closures.</p> |

| Topic | Proposal | Comments | Action required |
|-------|--|---|---|
| | | | Island-wide visitor caps in relation to dingoes to be investigated as part of next full visitor capacity review. |
| | Reduce vehicle-related dingo mortality | <ul style="list-style-type: none"> Enforcement of speed limits and appropriate behaviour will continue for both human and wildlife safety. Identification of key dingo sites will assist informing potential seasonal access restrictions. Increased permit costs or other measures to encourage reduced traffic should be investigated. | Continued research into key locations as above. Increased permit costs or other measures to encourage reduced traffic should be investigated. |
| | Additional visitor information centres | <ul style="list-style-type: none"> New visitor information centres, and improved interpretation (i.e. touch-screen displays) would be beneficial. A cost-benefit analysis is required to determine feasibility and ideal locations. | Cost-benefit analysis to determine feasibility and ideal locations for new visitor centres. Increased focus on interpretative displays should be considered as part of the education strategy. |
| | Education expanded to local schools | <ul style="list-style-type: none"> This has already occurred but has been limited by available resources. It has been suggested that education of teachers to provide this may be a more cost efficient approach. This option should be pursued, resource permitting. | Education of teachers to disseminate to students should be investigated. |
| | Additional volunteer engagement | <ul style="list-style-type: none"> Volunteers currently assist in some activities (i.e. scat collection). An increased focus on volunteer engagement would add value in activities that might not otherwise be performed with staff time constraints, and assist QPWS staff time to be allocated to other areas of the FIDMS. However, involving volunteers in activities that require a high level of skill or training, or that relate directly to human safety issues is generally not advisable. Volunteers should either be used only for relatively routine tasks, or should be highly trained, which can be problematic given high turnover rates and lack of reliability of volunteers compared with paid staff. | Improve volunteer engagement. |
| | Potential for chat- | <ul style="list-style-type: none"> This could be an effective means of QPWS engaging with stakeholders and directly addressing | |

| Topic | Proposal | Comments | Action required |
|----------|---|---|--|
| | room/Facebook | <p>potential misinformation.</p> <ul style="list-style-type: none"> QPWS is currently exploring opportunities to have a Facebook presence and make use of other social media, and the possibilities of development of more interactive websites. This should continue to be pursued as a high priority. Regional QPWS should continue to lobby for an appropriate presence in this arena. Once QPWS has developed appropriate policies, it would be useful to undertake a trial of using web based media to communicate to interested parties. Fraser Island dingo management could serve as a useful (high priority) pilot project for exploring this issue more generally on behalf of QPWS. Additional staff time, training and resources would be needed. Delegation to appropriate level would be required to ensure timely response. The use of video images (i.e. remote sensing cameras) on web sites, which could go live with appropriately trained staff to improve dingo appreciation. Showing healthy Fraser Island dingoes in their natural environment may reduce the need for people to interact with them on the island. | |
| | Utilisation of barges for education | <ul style="list-style-type: none"> Ambient sound is reportedly an issue that restricts the use of audio messages on barges. Fraser Island Natural Integrity Alliance are currently developing digital photo frames to be installed on barges that will include dingo material. Other options should be explored, especially the possibility of interpretative plans or briefings at departure points and/or on barges, and handing out dingo safety information to all visitors on barges. | Transit should be more effectively utilised for dissemination of messages. |
| | Environmental fee or increased permit costs | <ul style="list-style-type: none"> A small fee for all visitors should be considered to provide additional funding for conservation, and to increase awareness of management issues and encourage appropriate behaviour. Mandatory registration would also overcome the current issues with collection and collation of accurate visitor data. | Consider an environment/registration fee to provide for conservation and overcome issues with accurate visitor data. |
| Research | Investigate/trial birth control options for habituated bitches to break the habituation cycle | <ul style="list-style-type: none"> Habituated bitches, even those that are not directly problematic, are reported to 'train' their pups to steal and/or solicit food, which appears to lead to aggressive behaviour in pups as they become sub-adults (QPWS2012, pers. comm. 6 Oct). In order to break this cycle of habituation, it is recommended that a birth control trial be investigated to reduce incidents and the need for destruction of aggressive dingoes. Such a trial should be informed by population studies to determine potential population impacts. It should be run concurrently with a behaviour study to determine whether the sterilised bitch allows breeding by subordinate females. The trial should only be with a reversible contraception, such as a deslorelin implant. | Trial a reversible contraception in attempt to break the habituation cycle. |

Appendix 6

Online survey questionnaire

Ecosure has been engaged by the Department of Environment and Heritage Protection to conduct an objective and scientific review of the 2006 Fraser Island Dingo Management Strategy (FIDMS).

The FIDMS was originally released in 2001 and its key objectives include ensuring the sustainability of a wild dingo population on Fraser Island, reducing the risk to humans and providing visitors with a safe opportunity to view dingoes in an environment as near as possible to their natural state.

We are seeking your valuable input for consideration in our review. Your participation is voluntary, and results will be kept anonymous in accordance with the national guidelines and the Information Privacy Act 2009.

EDUCATION

The following questions have been adapted from visitor surveys previously conducted on Fraser Island.

1. From your personal point of view, are these statements true or false?

(Questions taken from previous education strategy review, will assist determining key demographics that have misconceptions and should have targeted education.)

| | Definitely true | Probably true | Definitely false | Probably false | Unsure |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| It is important to store food carefully. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Parents should keep small children close, but older children are safe by themselves. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Walking alone on or near the beach is not a risk for adults. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Dingoes are very dangerous. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Some camp sites have food lockers where food can be secured. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My group has talked about special care in storing food when we get to the island. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

2. Based on your knowledge and experience of dingoes, are these statements true or false?

(Questions taken from previous education strategy review, will assist determining key demographics that have misconceptions and should have targeted education.)

| | Definitely true | Probably true | Definitely false | Probably false | Unsure |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Dingoes that look thin are likely to be very hungry. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Dingoes are very much like pet dogs. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Walking in groups is recommended on the island as a safety precaution because dingoes roam all over the Island. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| There are large fines (up to \$4000) for feeding dingoes. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| It is OK to go close to dingoes to get a good photo. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Dingoes can open iceboxes. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I know enough to tell my children (or group members) how to behave if they encounter a dingo on Fraser Island. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I don't know enough about wild dingo behaviour yet. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| There are large fines (up to \$4000) for leaving food or rubbish lying around. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Dingoes on Fraser Island are hunters and can find natural food to sustain themselves. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| All dingoes on Fraser Island are 'pure'. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| There are 'pure' dingoes on mainland Australia. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Fraser Island dingoes are more important than their mainland counterparts. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Dingoes are protected by legislation in protected areas (such as National Parks). | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Dingoes are protected by legislation outside protected areas (such as National Parks). | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

FRASER ISLAND DINGO MANAGEMENT REVIEW

The following questions are categorised into four topics around the key themes of the current Fraser Island Dingo Management Strategy (2006):

1. Managing People – Awareness and education programs to encourage appropriate behaviour towards dingoes by visitors, residents and staff.
2. Managing Dingoes – Programs to modify dingo behaviour that threaten human safety and wellbeing, humane destruction of dingoes identified as dangerous and culling if research shows that the population is not in balance with seasonal availability of natural foods.
3. Research – Comprehensive scientific research and monitoring undertaken to ensure the principles and practices of dingo management are sound.
4. Fraser Island World Heritage Area, natural and cultural values – Fraser Island was listed as a World Heritage Area in 1992 for its outstanding natural values such as its biodiversity, dune systems, lakes and tall rainforests. Fraser Island, called K'gari by its Aboriginal inhabitants, also has a rich cultural history with Aboriginal occupation for at least 5,000 years.

To help assess the effectiveness of the FIDMS, each question is related back to each of the overall objectives of the FIDMS:

- Human safety - reduce the risk posed to humans by Fraser Island dingoes to an acceptable (low) level, and reduce the frequency of aggressive and destructive behaviour of Fraser Island dingoes.
- Dingo wellbeing/welfare – animal welfare and ethical considerations of activities undertaken under the strategy.
- Dingo conservation – ensure the conservation of a sustainable wild dingo population on Fraser Island.
- Visitor experience – provide Fraser Island visitors with a safe, enjoyable opportunity to view dingoes in an environment as near as possible to their natural state.

3.

TOPIC 1 - Managing People

How effective has the FIDMS been to improve people's behaviour around dingoes in relation to:

| | Effective | Partly effective | Not effective | Unsure | Not Applicable |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| human safety? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| dingo wellbeing/welfare? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| dingo conservation (maintaining a sustainable population)? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| visitor experience | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

4.

TOPIC 2 - Managing Dingoes

How effective has the FIDMS been in managing dingoes in relation to:

| | Effective | Partly effective | Not effective | Unsure | Not Applicable |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| human safety? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| dingo wellbeing/welfare? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| dingo conservation (maintaining a sustainable population)? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| visitor experience | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

5.

TOPIC 3 - Research

How effective has the FIDMS been toward ensuring that appropriate research is undertaken:

| | Effective | Partly effective | Not effective | Unsure | Not Applicable |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| human safety? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| dingo wellbeing/welfare? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| dingo conservation (maintaining a sustainable population)? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| visitor experience | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

6.

TOPIC 4 - Fraser Island World Heritage Area, Natural and Cultural Values

How effective has the FIDMS been in regard to ensuring the world heritage, natural and cultural values of Fraser Island are protected?

- ☐ Effective
- ☐ Partly effective
- ☐ Not effective
- ☐ Unsure
- ☐ Not Applicable

7. Values - Please rate how you value each of the following in the context of Fraser Island (1 being not at all; 5 being extremely important):

| | 1 | 2 | 3 | 4 | 5 |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Minimising human risk? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Animal welfare? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Conservation of the wild dingo population? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Visitor experience? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

8. Ethical considerations - How appropriate do you find the following management options for dingoes on Fraser Island:

| | Never appropriate | Sometimes appropriate | Always appropriate | Unsure |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| Humane destruction/culling? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Hazing (i.e. use of non-lethal methods, such as sling shots, to discourage dingoes from interacting with humans)? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Excluding dingoes from campgrounds (i.e. fencing)? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Ear tagging to allow identification of individual dingoes? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Translocation of problem animals to a zoo or breeding centre? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Leaving dingoes completely unmanaged? | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

9. General Feedback - What improvements can you suggest in relation to improving the effectiveness of FIDMS?

DEMOGRAPHIC

* 10. What is your country of residence?

* 11. What is your post code?

12. What is your age category?

- ☐ Under 16 years
- ☐ 16 – 24 years
- ☐ 25 – 34 years
- ☐ 35 – 44 years
- ☐ 45 – 54 years
- ☐ 55 – 65 years
- ☐ More than 65 years

13. What is your gender?

- ☐ Female
- ☐ Male

14. Please tick all of the following that describe you:

- ☐ Recreational visitor to Fraser Island during the last year
- ☐ Recreational visitor to Fraser Island during the last five years
- ☐ Member of community group with an interest in Fraser Island dingo management.
- ☐ QPWS staff member
- ☐ Resident of Fraser Island
- ☐ Tourism-related business operating on Fraser Island.
- ☐ Traditional owner of Fraser Island
- ☐ Academic researcher

Please specify which organisation you represent

15. How many times have you been to Fraser Island?

- ☐ Never
- ☐ Once
- ☐ 2 – 5 times
- ☐ 6 – 10 times
- ☐ More than 10 times

16. Please rank your top three preferred methods of receiving information relating to dingoes on Fraser Island (1 being most preferred)?

(Question aimed at identifying target mediums for information provision.)

| | |
|----------------------|---|
| <input type="text"/> | Online - web pages |
| <input type="text"/> | Online - social media (i.e. facebook, twitter, blogs) |
| <input type="text"/> | In person by QPWS staff |
| <input type="text"/> | During transit to the island |
| <input type="text"/> | Interpretative i.e. signage on the island |
| <input type="text"/> | Tour operator |
| <input type="text"/> | Brochures |
| <input type="text"/> | Media - radio, TV, newspaper |
| <input type="text"/> | Other |

Appendix 7

QPWS staff interview questions

Note:

- The term 'communications' is used in these questions to cover public education and communications, on and off park.
- Communications questions were asked of senior staff with responsibilities for education/communications, and rangers.
- Enforcement questions were asked of senior staff with responsibilities for enforcement, and rangers.
- Questions 16-21 were asked of senior staff but not rangers.
- Asterisks indicate reference to the supplementary information at the end of this interview sheet, to which respondents were referred in order to these questions.

1. To what extent do you believe each key objective* has been met?
2. Describe evidence supporting achievement of each objective?
3. What do you consider the main obstacles to full achievement of each objective, and suggested solutions?
4. Are there any audience groups for which there have been significant problems with compliance with appropriate dingo-related behaviour? (what is problem, your perception of why, suggested solution?)
5. Describe evidence of achievement of each objective being affected by communications?
6. Describe evidence of achievement of each objective being affected by enforcement?
7. Are these the key messages** you aim to communicate? Do you consider these messages appropriate? (What if any changes needed?)
8. To what extent have each of the key messages been communicated effectively to all desired audiences? Describe evidence supporting effective communication of each (other than visitor surveys)? Obstacles and suggested solutions?
9. To what extent has each of the following communication methods been effective? (a) face-to-face rangers, (b) signage, (c) written materials, (d) website (e) other major? (state) Describe evidence supporting achievement of each (other than visitor surveys)? Obstacles and suggested solutions?
10. To what extent has distribution of communication material been effective in reaching required audiences? Obstacles and suggested solutions?
11. What obstacles or difficulties do you/rangers face in conducting communication effectively? Suggested solutions?
12. What obstacles or difficulties do you/rangers face in conducting enforcement effectively? Suggested solutions?
13. Any other suggestions for improving effectiveness of communication or enforcement not covered above?

14. Considering the above answers, what are your suggested top 3 priorities in order to improve effectiveness of communication in achieving objectives?
15. Considering the above answers, what are your suggested top 3 priorities in order to improve effectiveness of enforcement in achieving objectives?
16. Any additions/changes needed to introductory sections of the FIDMS (or Communication Plan or 2010-15 schedule) re communications or enforcement? e.g. in objectives, principles, focus, strategies or communication messages . What significant changes/issues have occurred that might justify these e.g. political environment, legislation, stated targets to cater for the above?
17. Any (other) significant concerns about adequacy or appropriateness of objectives, principles, focus, strategies in FIDMS re communications or enforcement, or in Communication plan? Suggested changes to cater for the above?
18. Any other significant concerns about adequacy or appropriateness (including number) of actions in FIDMS re communications or enforcement, Communication plan or 2010-2015 Implementation Schedule? Suggested changes to cater for the above?
19. To what extent are resources adequate to achieve objectives re communications (staff, staff time, funds, facilities)? (adequate, slightly inadequate, very inadequate). What are main areas and impacts of any inadequacies? Suggested key additional resources needed?
20. To what extent are resources adequate to achieve objectives re enforcement (staff, staff time, funds, facilities)? (adequate, slightly inadequate, very inadequate). What are main areas and impacts of any inadequacies? Suggested key additional resources needed, for what?

Supplementary information

*Objectives for education and enforcement (from FIDMS 2006)

People living, working or visiting Fraser Island are:

- **Aware** of natural dingo behaviour, including likelihood of habituation, attraction and potential aggression towards humans.
- **Alert** to the potential dangers that dingoes may pose, especially towards children.
- **Active** in behaviours that minimise risk (my sub-categories):
 - Refrain from deliberate feeding – goal from FIDMS is reduce and eventually eliminate
 - Refrain from inadvertent feeding including availability of other human sources – goal from FIDMS is reduce and eventually eliminate
 - Behave 'safely' around dingoes (e.g. stay with children, walk in groups, reactive behaviour if dingoes show aggression).
- **Attentive** to individual dingo characteristics for ID purposes (from Comms Plan 2004)
- Provide visitors with a safe, **enjoyable** opportunity to view dingoes in an environment as near as possible to their natural state.
- 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.

****Key education messages** (from draft community engagement plan 2012; slightly condensed and re-organised)

- Dingoes are wild and unpredictable; seasonal behaviour
- How to behave in relation to dingoes: walk in groups, keep children very close, how to behave if dingoes come close, threaten or attack
- Keep food secure, clean up after cooking, secure fish/bait/berley
- It is an offence to feed dingoes
- Report dingo incidents
- Dingo ID tips.

Appendix 8

Research literature review summary

Angel, DC (2006) 'Dingo diet and prey availability on Fraser Island' Masters thesis, University of Sunshine Coast.

This thesis investigates the relationship between prey availability (small mammal trapping and tracking data) and dingo diet (assessed from 126 scats). Human-derived food comprise <9% of dingo diets, which are primarily comprised of small and medium sized mammals (i.e. bandicoots and rats). Passive activity indices (or sand plots) are recommended for monitoring dingo prey availability. The results of this study imply that dingoes largely rely on 'natural' foods, while retaining generalist diets capable of exploiting human-derived food sources if available. The study also provides good coverage of the relevant literature.

Appleby, R and Jones, D (2006) *A preliminary evaluation of a GPS collar for dingoes on Fraser Island*. Griffith University.

This short draft report discusses the results of a one-day trial on the performance of a single GPS collar. The collar was taped to the bull-bar of a vehicle for several hours, and was also worn around the neck of a person for about an hour. The vehicle and person travelled through beach and forest habitats. The collar performed reasonably well under these conditions, and some recommendations were made about potential future monitoring of dingoes using GPS collars.

Appleby, R and Jones, D (2011) *Analyses of preliminary dingo capture-mark-recapture experiment of Fraser Island, conducted by the Queensland Parks and Wildlife Service*. Griffith University: Mt Gravatt.

This study discusses the results and outcomes of an attempt to ascertain a dingo abundance estimate through a capture-mark-recapture approach. Two primary population sampling techniques were used (e.g. cameras and live-trapping). As anticipated before commencement of the study, resource and logistical limitations plagued the implementation of the research, which ultimately produced a highly uncertain (but not unexpected) dingo abundance estimate (~150 dingoes; ± 50). This estimate was no different from prior estimates derived from other coarse approaches which were much less expensive and less difficult. The authors recommended collaring individual dingoes; an approach much more likely to provide the data needed to ascertain a more reliable abundance estimate, as well as providing a variety of other very useful data. In any event, an accurate abundance estimate is specific only to a given point in time. Change in dingo abundance (i.e. increasing or decreasing) is likely more important than the number present on the Island at a given point in time.

Burns, GL (2006) 'The fascination of fur and feathers: managing human-animal interactions in wildlife tourism settings', *Australian Zoologist*.

Interactions between people and non-human animals in non-captive Australian wildlife tourism settings are often managed by government organisations. The Queensland Parks and Wildlife Service (QPWS), a division of the Queensland Environmental Protection Agency (EPA), took over

as the governing body from the Forestry Department in 1991, followed by the Island being declared a World Heritage Area in 1992 succeeding development opposition by environmental groups and subsequent recommendations of the Fitzgerald Commission of Inquiry. Since then, the number of visitors to Fraser Island has grown significantly with current visitor numbers of approximately 300 000 per annum (EPA 2005b:21).

QPWS management response to the death of a child due to a dingo attack was necessarily swift and attracted much criticism from animal welfare groups and other concerned stakeholders. 31 dingoes were immediately culled and their ongoing management includes culling of identified problem dingoes, hazing, fencing, and a people targeted campaign to dissuade feeding: 'Be Dingo Smart', which includes large fines for misdemeanours. Consequently) tourists are less likely to come into contact with this form of wildlife. This outcome is not necessarily welcomed by tourists who visit the Island with the expectation of seeing dingoes, or by tour operators who have used the dingo image widely as a positive marketing tool.

Ultimately, this research has shown that government organisations such as QPWS need to be responsive to the needs and expectations of people as well as the needs of wildlife in their management of natural settings. It also shows how human expectations of wildlife management shift with changing public perceptions of the values and threats associated with wildlife species themselves.

DERM (2010) *Interim report Stage 1, July 2010. Fraser Island dingo population study.* Department of Environment and Resource Management, Brisbane.

This brief report discusses the preliminary outcomes of a collaring and photographing exercise to determine and abundance estimate of the Fraser Island dingo population. Only basic descriptive results are provided (such as the number and proportion of juveniles and adults collared and photographed), but these raise some important ecological questions which could be addressed in future research activities. From data on ages, weights and sexes, it appears that dingoes are in generally good physical condition, with a normal mix of ages and sexes. Application of the best abundance estimate techniques suggest a dingo population size in excess of 200 individuals.

Edgar et al (2007) 'Efficacy of an ultrasonic device as a deterrent to dingoes (*Canis lupus dingo*): a preliminary investigation' *Journal of Ethology*.

Since the death of a child in 2001, the Dingo Management Strategy proposed ultrasonic deterrents as one of a number of non-lethal management techniques requiring further investigation. The Weitech Yard and Garden Protector (YGP) ultrasonic unit was used during the experiment. Measurements taken using a sound pressure level (SPL) meter revealed no reflected sound behind the unit. The YGP unit was found to produce sound in a very narrow band of frequencies, between 24 KHz and 25 KHz, with a cycle taking only around 100 ms. The DCESQ facility was also tested for ambient ultrasonic noise using the SPL meter with a 20-KHz filter; however, no signal in the meter's operational range was detected.

It was found that the ultrasonic unit assessed was ineffective in deterring the four dingo subjects from eating the proffered food lures.

Elledge et al (2006) 'Assessing the taxonomic status of dingoes *Canis familiaris dingo* for

conservation' *Mammal Review*.

The greatest constraint on the conservation of the dingo, as a distinct subspecies is hybridization with the domestic dog *C. f. Familiaris*. The process of hybridization dilutes the proportion of 'pure' dingo genes present in a population and may result in colour and body form changes which detract from its aesthetic value. Furthermore, hybridization may result in behavioural or reproductive changes that could have an adverse impact on Australian mammals that have adapted to predation by dingoes.

Genetic analyses with the use of allozymes (comparing protein sequences after electrophoresis) indicated that dingo and dog populations could not be differentiated because there was little genetic variation at the loci tested. Multiple other methods were used with various degrees of success however many researchers and managers are hopeful that in the future a genetic assay will become available that can rapidly determine the level of hybridisation in the field.

Skull morphology is an established method for estimating dingo purity, but has limited use for the field-based conservation of dingoes. This is because skull measurements can only be measured reliably on dead adult animals. The guideline as to what actually constitutes a 'pure' dingo based on skull morphology has been revised in recent years. Macintosh (1975) assigned a development grade from one to three for each of the 11 skull characters under consideration. The status of each animal was determined by the simple addition of these values, and was the sole criteria for identifying pure dingoes.

The use of coat colour and other visual characters to assess dingo purity is the most practical method to apply in the field because these characters can be readily observed. The coat colours thought to be most characteristic of dingoes are ginger, black-and-tan, black and white. The reliability of coat colours is not always reliable.

However, the conservation of the dingo as a distinct subspecies requires first a method that can reliably discriminate 'pure' dingoes from dingo–dog hybrids. At present analyses of genetic variation and skull morphology are the established methods for estimating the degree of introgression with domestic dogs. However, as previously outlined, the reference specimens used as a benchmark for 'pure' dingoes do not allow hybrids with different levels of dingo ancestry to be identified and neither method can be practically applied to live animals in the field.

Elledge et al (2008) 'An evaluation of genetic analyses, skull morphology and visual appearance for assessing dingo purity: implications for dingo conservation' *Wildlife Research*.

The arrival of domestic dogs (*C. lupus familiaris*) with European settlers in the 18th century has resulted in significant levels of hybridisation between the two subspecies, and this is now regarded as the greatest threat to the long-term survival of the 'dingo' (Corbett 1995, 2001). However, dingo conservation efforts are hampered by difficulties in distinguishing between dingoes and hybrids in the field. This study evaluates consistency in the status of hybridisation (i.e. dingo, hybrid or dog) assigned by genetic analyses, skull morphology and visual assessments. Of the 56 south-east Queensland animals sampled, 39 (69.6%) were assigned the same status by all three methods, 10 (17.9%) by genetic and skull methods, four (7.1%) by genetic and visual methods; and two (3.6%) by skull and visual methods. Pair-wise comparisons identified a significant

relationship between genetic and skull methods, but not between either of these and visual methods. Results from surveying 13 experienced wild dog managers showed that hybrids were more easily identified by visual characters than were dingoes. A more reliable visual assessment can be developed through determining the relationship between (1) genetics and phenotype by sampling wild dog populations and (2) the expression of visual characteristics from different proportions and breeds of domestic dog genes by breeding trials. Culling obvious hybrids based on visual characteristics, such as sable and patchy coat colours, should slow the process of hybridisation.

Jenkins, D, Allen, L and Goullet, M (2008) 'Encroachment of *Echinococcus granulosus* into urban areas in eastern Queensland, Australia' *Australian Veterinary Journal*.

Intestines of humanely destroyed wild dingoes (deemed aggressive and a potential risk to public safety) were collected and the contents examined for intestinal parasites. *Echinococcus granulosus* was only present in the wild dogs from Maroochy Shire (46.3%) with worm burdens of between 30 and 104,000. Other helminths included *Spirometra erinacei*, *Dipylidium caninum*, *Taenia* spp., *Ancylostoma caninum* and *Toxocara canis*. Two specimens of a trematode (*Haplorchinae* sp.) usually found infecting fish and seabirds were recovered from a Fraser Island dingo. It was concluded that Dingoes on Fraser Island are not infected with *E. Granulosus* and do not pose a hydatid disease public health risk to residents or visitors. However, wild dogs examined from the Maroochy Shire do present a potential hydatid disease public health risk.

Lowe, M and Harvey, J (2012) *A Rapid Assessment Methodology of Habitat Suitability for the dingo (Canis lupus dingo) on Fraser Island*, Prepared for Department of Environment and Resource Management, Fraser Island Natural Integrity Alliance and The University of the Sunshine Coast.

This report is a largely botanical study describing appropriate methods for assessing vegetation communities on Fraser Island. Given that dingoes can successfully almost all habitat types within their extended range, the relevance to their management is unclear.

Appendix 9

Summary of key education documents

| Year | Document/ Initiative | Notes, including relationship between documents |
|------|---|--|
| 1989 | Dingo education materials first provided on Fraser Island, with subsequent additions. | |
| 1998 | Be Dingo Smart! campaign first implemented, including dingo talks with campers. | Based for the first time on a strategic approach, which uses persuasive communication theory. |
| 1999 | Draft Fraser Island Dingo Management Strategy (FIDMS) released for public comment, and key actions implemented, including expansion of education program. | The FIDMS provided the first formalised planning basis for dingo-related education ('awareness programs') and included additional or enhanced actions involving dingo education. |
| 2001 | Fraser Island Dingo Management Strategy released. Be dingo-safe! Education program commences. | |
| 2003 | Evaluation of dingo education strategy and programs for Fraser Island and Literature Review (Environmetrics 2003) | Provides underpinning for all subsequent dingo education; used to develop 2004 Dingo Communication plan; very detailed evaluation of education program and review of persuasive communication and international experience. |
| 2004 | Managing dingoes on Fraser Island: Communication Plan (Beckmann 2004) | Main plan guiding subsequent dingo communications till present. Derived mainly from the 2003 education evaluation. |
| 2006 | Fraser Island Dingo Management Strategy 2006 | Slightly updates and extends education-related actions from the FIDMS 2001 based on recommendations from the 2003 education review. Refers to Communication Plan 2004 as main document guiding dingo communication strategy and summarises its main components. |
| 2009 | Review of 2004 Dingo Communication Plan (Environmetrics 2009) | Evaluates effectiveness of 2004 dingo communication plan. Evaluation methods much more limited than for 2003 evaluation. Includes audit of actions in 2004 plan. Identifies new challenges and priorities. Recommends continuing to use the 2004 plan as a basis, but with modifications and additions to be incorporated in a new communication plan to cover the period 2010-2015. Recommends a new framework to use for this plan, but does not list actions. |
| 2010 | A Review of Recent Academic and Management Literature Related to Communication Strategies Focused on Minimising Human-Wildlife Conflict, in the Context of the Fraser Island Dingo Communication Plan (Beckmann 2010) | Reviews relevant literature available since the 2003 education review and draws out lessons for Fraser Island dingo communications. A draft version of this report fed directly into the 2009 review of the dingo communication plan. |
| 2009 | Audit (2009) of Fraser Island Dingo Management Strategy (Corbett 2009) | Includes a brief audit of all actions listed in the FIDMS 2006, including those relating to education. |

| Year | Document/ Initiative | Notes, including relationship between documents |
|--------------------------|---|---|
| Updated on regular basis | Implementation schedule: Fraser Island Dingo Communication and Community Engagement 2010-2015 (QPWS informal internal document) | Internal document comprising a list and audit of actions relating to each of the new focal areas recommended in the 2009 review of the dingo communication plan. Does not cover other aspects of the dingo communication plan. Refers to a planned 'Strategic Directions Document' for Fraser Island dingo communication and community engagement, which has led to the draft Community Engagement Plan detailed below. |
| 2012 | Fraser Island visitor survey: feedback on communication about dingoes on Fraser Island (Deborah Wilson Consulting Services 2012, draft) | <p>Presents methods and results of:</p> <ul style="list-style-type: none"> Visitor survey to provide feedback on effectiveness of dingo communications. Methods congruent with those in the 2003 education evaluation. Comparison of results from these two surveys presented. Structured interviews with 11 tourism operators (tour/4WD operators and hostels) regarding their perceptions of visitor knowledge and behaviour, materials they use and find useful, perceived most important education messages, suggested improvements. <p>Includes very limited conclusions and recommendations.</p> |
| In prep. | Fraser Island dingoes: Community Engagement Plan (2012, draft) | <p>Designed to support the FIDMS education strategy and guide community engagement. Contains list of strategies with associated messages, audiences and detailed actions. Includes appendices on: overview of current dingo education activities, list of key stakeholders and target audiences, and target audience characteristics (derived mainly from Environmetrics 2003). Lacks formal planning structure.</p> |

Appendices have been developed as a supplement to the body of the report and should not be read in isolation.

Appendix 10

Stakeholder workshop summary

Stakeholder Workshop

Friday 5th October, 2012

Date: Friday 5th October, 2012

Time: 8.30am – 12.00pm

Venue: Maryborough Motel and Conference Centre

Background

Ecosure has been engaged by the Department of Environment and Heritage Protection to conduct an objective and scientific review of the 2006 Fraser Island Dingo Management Strategy (FIDMS). As part of the consultation process, a public workshop was held to obtain valuable input from stakeholders and interested parties for consideration in our review.

The overall objectives of the FIDMS are to:

- ensure the conservation of a sustainable wild dingo population on Fraser Island
- reduce the risk to humans
- provide visitors with safe opportunities to view dingoes in environment in near as possible to their natural state.

Animal welfare and ethical considerations underpin the FIDMS, and the welfare and wellbeing of dingoes is considered a key objective.

The workshop focused on key themes of the current Fraser Island Dingo Management Strategy (2006):

1. Managing People
2. Managing Dingoes
3. Research
4. Fraser Island World Heritage Area, Natural and Cultural Values.

Themes were then related back to each of the overall FIDMS objectives above.

Program

| ITEM | TIME | WHO | DETAIL |
|-----------------------------|--------------|------------------------------|---|
| Arrival | 8:15 onwards | All | Greeting and registrations. |
| Introduction and background | 8:30 | Scott Hetherington (Ecosure) | Welcome, housekeeping and introductions. Terms of reference, purpose of review, role of RSC and FIWHA, natural and cultural values. |
| Panel presentations | 8:50 | Ross Belcher (QPWS) | Managing people presentation. |
| | 9:00 | Dr Lee Allen (BQ) | Managing dingoes presentation. |
| | 9:10 | Dr Leah Burns (GU) | Research presentation. |
| | 9:20 | Mr Kevin Bradley (RSPCA) | Animal welfare/ethics presentation. |
| Facilitated Discussion | 9:45 | All | Questions from the floor to the expert panel. |
| Morning Tea | 10.30 | All | 15 minute recess |
| | | | Participants requested to identify a theme (managing people; managing dingoes; research; World Heritage values) to participate in focus group discussion. |
| Focus groups | 10.45 | Ecosure | Focus groups to identify and discuss respondent's view of the effectiveness of the FIDMS and allow for additional comment. |
| Wrap-up | 11.45 | Ecosure | Close workshop. |

Workshop participants

A variety of stakeholder groups were represented by a total of 65 workshop participants (excluding panel members and facilitators), including:

- Burnett Mary River Group (BMRG)
- Butchulla people
- Dingo Conservation and Education Association Qld
- Durong Dingo Sanctuary
- Fraser Coast Regional Council
- Fraser Coast Tess Wildlife Sanctuary
- Fraser Explorer Tours
- Fraser Island Association (FIA)
- Fraser Island Defenders Organisation (FIDO)
- Fraser Island Natural Integrity Alliance (FINIA)
- Fraser Island residents
- Fraser Island visitors and general community
- Fraser Island World Heritage Area (FIWHA) Committees
- Hervey Bay Electorate Office of Mr Ted Sorensen MP
- Kingfisher Bay Resort
- National Animal Rescue Groups Association (NARGA)
- National Dingo Preservation and Recovery Program (NDPRP)
- National Parks Association of Queensland (NPAQ)
- Queensland Parks and Wildlife Service (QPWS)
- Royal Society for the Prevention of Cruelty to Animals (RSPCA)
- Save Fraser Island Dingoes (SFID)
- Sunfish
- World Society for the Protection of Animals (WSPA)

Introduction and background

Scott Hetherington (Regional Manager, Ecosure)

Introduction

- Welcome and acknowledgement of the Butchulla people as the traditional custodians of the land and other Aboriginal people present.
- The aim of the workshop is to gather as much input as possible to ensure best possible quality review.

Introduction to Ecosure:

- Ecosure's establishment and development over the past 16 years into a successful company with offices in Brisbane, Sunshine Coast and Rockhampton is founded in best practice wildlife management.
- In particular, research and investigation into identification of solutions to situations where wildlife and humans cause problems for each other.

- Our approach is to use great science and our great people to achieve best possible outcomes for biodiversity conservation and our clients' needs.

Introduction of the Ecosure FIDMS review project team:

- Jessica Boswell (Project Manager) - Wildlife Biologist currently completing a Master of Environmental Science. She has a keen interest in dingo conservation with more than eight years experience managing wildlife projects for local and Federal government, private industry and the resource sector.
- Dr Karen Higginbottom (Ecologist) - University academic and researcher in wildlife management for more than 20 years. Now self-employed consultant and Adjunct Associate Professor at Griffith University. Previously responsible for leading research programs of Sustainable Tourism CRC on Wildlife Tourism & Sustainable Resources.
- Ben Allen (Dingo Ecologist) - Ben has over 10 years experience in dingo research and management in Queensland, New South Wales, and Victoria, and has worked on both dingo conservation and control initiatives. He has published extensively on dingo ecology and management, and is presently involved in researching human-dingo conflicts and the ecology of dingoes in peri-urban areas.
- Scott Hetherington (Project Advisor) - Scott has worked extensively in the field of conservation management in both Queensland and New South Wales. Scott has played a key role in the delivery of regionally significant conservation projects including NatureSearch, South East Queensland Regional Plan, Byron Biodiversity Conservation Strategy, Gold Coast City Nature Conservation Strategy, Biodiversity Planning Assessments Tweed Byron Bush Futures and the Nature Refuge program.
- Emily Hatfield (Project Support) – Emily has 14 years experience in the wildlife industry and environmental education sector. As an ecologist for Ecosure, Emily has performed environmental assessments of flora and fauna habitat, as well as undertaking project administration, field survey preparation and report writing for a range of projects. A versatile member of Ecosure, Emily has also contributed to the design and facilitation of community engagement projects as well as assisting in the field with bush regeneration.

Introduction of the Workshop expert panel

- Expert panel convened for the workshop to provide information relevant to each of the strategy themes. All stages of consultation for the review aligned with these themes also.
- Each expert panel member will present a brief presentation aligned with the relevant theme, participate in group discussion including responding to questions from the floor & assist in providing any other required information during the focus group sessions
 - Managing People - Mr Ross Belcher - Regional Manager, Great Sandy QPWS
 - Managing Dingoes - Dr Lee Allen - Senior Zoologist, Biosecurity Queensland
 - Research - Dr Leah Burns - Senior Lecturer, Griffith University
 - Animal welfare - Mr Kevin Bradley – Director, Veterinary Services and Animal Operations

Background and project structure

- FIDMS review background and the terms of reference, required outcomes and project scope for the review presented

- The roles of each project stakeholder and governance model was presented and discussed including introduction and roles of the Review Steering Committee (RSC)
 - RSC convened by Department of Environment and Heritage Protection to monitor, evaluate and review work by consultant, provide independent point of contact for consultant to discuss issues relevant to the review, and provide recommendations to Minister for revision of FIDMS
 - Chair – Professor Hugh Possingham (UQ School of Biological Sciences)
 - Professor Clive Williams (UQ School of Veterinary Science)
 - Ms Sue Sargent (Burnett Mary Regional Group)
 - Professor Chris Johnson (UTAS School of Zoology)

Progress to date

- progressive review of methods and delivery of project objectives by steering committee
- consultation (model presented and discussed)
- literature compilation and review
- site assessments & case studies
- analysis of incident data, protocols and procedures (including multicriteria decision analysis).

Fraser Island World Heritage, Natural and Cultural Values

World Heritage values – FIWH values recognised by the FIDMS and key theme for inclusion in the review. Fraser Island listed in 1992 based on outstanding universal value, including:

- tall rainforest on sand – unique in the world
- half of the world's perched freshwater dune lakes
- ongoing geological processes including longshore drift
- biological processes including unusual rainforest succession and development of rare and biogeographically significant species of plants and animals.

For the purposes of the review, other significant natural and cultural values have been incorporated for consideration with the actual listed values.

Expert Panel Presentations

Managing People

Ross Belcher (Regional Manager Great Sandy, Queensland Parks and Wildlife Service (QPWS))

- Fraser Island or K'Gari to the Butchulla people is the largest sand island in the world with outstanding natural values.
- In the National Park there are currently 28 unfenced campgrounds on eastern beach and 7 on western beach. QPWS has 4 fenced campgrounds, and is in the process of fencing another private campground.

- Many people visit and camp on the island i.e. in 2011-12 there were in excess of 200 000 camper nights in QPWS campgrounds; many more people use commercial accommodation and take day trips.
- The dingo population is estimated at 100-200 individuals depending on the breeding cycle and seasonal conditions.
- Range of legislation relevant to QPWS:
 - *Nature Conservation Act 1992*, and *Recreation Areas Management Act 2006*: prohibit unauthorised/inadvertent feeding of animals or disturbing animals (i.e. approaching, luring, harming, teasing, touching, etc) On the spot fine (penalty infringement notice) of \$330 which can be extended to \$4400 by a court (which can accumulate if required)
 - *Environment Protection and Biodiversity Conservation Act 1999*, relevant to World Heritage listing - a person must not take an action which will significantly impact on a natural World Heritage value of the island.
- Education has been a key aspect of the Fraser Island Dingo Management Strategy (FIDMS) since 1994. Broad objectives of the FIDMS are to;
 - ensure sustainability of wild dingo population on Fraser Island
 - reduce risk to humans
 - reduce deliberate and inadvertent feeding of dingoes by people
 - provide visitors with safe opportunities to view dingoes in environment in near as possible to their natural state.
- Much of this is achieved through visitor education.
- Current QPWS dingo safety actions include:
 - face to face camper briefings by rangers (3,500 in 2011-12)
 - media releases prior to busy periods, anticipation of problems/response to incidents
 - dingo websites including answers to Frequently Asked Questions
 - condition reports on internet including dingo safety information
 - brochures at various outlets
 - tour operators engaged and provided with updated information regularly
 - communication at meetings with Fraser Island Association, Fraser Island Natural Integrity Alliance and World Heritage Area (WHA) committees.
- Even with a comprehensive communications strategy some people do not behave appropriately, especially in relation to child safety and feeding dingoes. Rangers issued 26 infringement notices last year and many more warnings.
- Some people are not recognising that:
 - dingoes are wild predators – not similar to family pets
 - pups can look thin until learn to hunt effectively
 - dingoes are supposed to be lean and fit, and even lean animals are usually doing very well

- in any population some individuals are not equipped to survive And interference may have adverse effects on the viability of a population.
- Many people believe misleading and malicious information without question – big issue that QPWS constantly addresses.
- There are many positives, including a competent and committed workforce of rangers and support staff.
- Many community members and groups are supportive of the FIDMS.
- Some residents have signed up to volunteer and provide dingo safety messages to visitors to the island.
- The current government is reviewing the FIDMS, which provides significant opportunity for community input into a revised strategy for the management of a sustainable population of dingoes on Fraser Island for the future.

Managing Dingoes

Dr Lee Allen (Senior Zoologist, Biosecurity Queensland).

- State government researcher for more than 30 years - PhD looking at impact of dingoes on the beef industry and the impact of dingo control on dingoes and other wildlife.
- A fundamental ecological principle for any wildlife population is to maintain the same size from one year to the next, for every individual born, that animal or another animal in the population has to pass away over the following 12 months. If that doesn't occur the population either increases or decreases. This reproductive surplus, or expendable surplus, is what drives natural selection and survival of the fittest. Thus each year, a proportion of the dingo population on Fraser Island must die of old age or misadventure (i.e. snake bite), some are killed by other dingoes, many will starve to death because they don't have a territory or prey resources, and some will be culled. It means that there is almost always a reproductive surplus that must battle it out to find place in a social group and territory to survive.
- In context of Fraser Island there are approximately 100 adults, divided into 20-25 social groups that produce four to six pups per group on average, so approximately 100 pups each year. Therefore through the year 100 dingoes need to perish on Fraser Island from one cause or another. Any more and the population will decrease, any less and the population will increase.
- Satellite tracking studies in past five yrs show 15-40% of young dingoes disperse from their natal area, as much as several 100 kilometres away.
- Dispersing animals need to find vacant territory where they can settle, and they are often looking for places that are resource rich, and safe (from territorial dingoes). This quite often ends up around human settlements.
- Issues associated with urban dingoes or dingoes dispersing and coming into town are found across the eastern seaboard. Photos of dingoes in urban areas from Qld (refer to presentation) – (top left) Sunshine Coast at back of residences, (top right) Townsville city dumpster, (bottom right) Central Qld township.
- Highlighted that conflict between dingoes and people is not peculiar to just Fraser Island, but it is probably a more serious issue on Fraser Island because a large part of Fraser

Island's population live in tents where human waste and resources are available to dingoes, and where human-dingo interactions are closer and potentially more hazardous.

- Map showing dingo movement data from a Sunshine Coast study - transmitters attached to dingoes in urban areas taking five minute traces for a period of three weeks.

Research

Dr Leah Burns (Senior Lecturer, Griffith University)

- Lecturer at Griffith University and an Environmental Anthropologist – social scientist, not an ecologist or dingo behaviour specialist.
- Categorised research into two broad groups as a two-sided equation;
 1. Dingo side
 2. People side
- Dingo/ecology side:
 - Research has included scat collection and fauna surveys; results show dingoes eat a wide range of food.
 - DNA sampling – suggests some unique genetic characteristics, but lot of evidence of hybridisation in DNA samples.
 - Movement studies – collars have shown Fraser Island dingoes are moving fairly large distances.
 - UQ – data on movement of 18 dingoes collected from GPS satellite collars that QPWS put on May – June last year with location reported every couple hours. Programmed to drop off in two stages, some in January and some in March 2012. This data is currently being analysed to look at home ranges and movement patterns across the island.
 - Research on population – estimates on how many through recent capture-mark-recapture study – recognises that population changes over the year and estimated at 150 +/- 50.
 - Research on dingo behaviour – example: Leah involved in 2004 ultrasonic device trial to create barrier to keep dingoes out of certain place, had it on reasonably good authority worked on domestic dogs. Trialled in two locations without success – dingoes walked straight through it.
- People studies:
 - Includes human-wildlife conflict research.
 - Education includes the 'Be dingo smart'/'Be dingo safe' campaigns, with external review (i.e. Beckmann).
 - Marketing includes looking at way we think about dingoes and maybe that we need to change i.e. looking at inconsistencies, not just on FI, but nationally on how we market, think and approach to inform management e.g. native/introduced, pure/hybrid, pest/protected, Fraser Island as a WHA/tourist playground.
 - Although Fraser Island is unique in many ways, research and management on mainland and overseas also useful to look at to move forward.

- Also important to recognise importance of dingoes in the context of combating mammal extinctions in their role in reducing foxes and cats.
- Current research includes:
 - UQ - Population study collar data being analysed now and will be PhD study through UQ.
 - Griffith Uni – detailed look at overseas context in detail i.e. coyote/wolf management quite different, and likely lessons to be learnt.

Animal Welfare and Ethics

Kevin Bradley (Director of Veterinary Services and Animal Operations, RSPCA)

- Simplest definition of welfare within RSPCA – state of an animal as it tries to cope with its environment; considers physiological state, behavioural state and emotional state.
- FIDMS as it stands and many management strategies focus on conservation of species at a species level or landscape – welfare considers the individual level.
- Animals have intrinsic value and extrinsic values (value beyond own self i.e. cultural).
- Ethics – cross-over often between welfare and ethics. Philosophy that allows us to decide what's right/wrong, not absolutely, but in particular circumstance or for a particular group. Underpins our treatment of animals.
- Animal welfare law – RSPCA and Department of Employment, Economic Development and Innovation act under the *Animal Care and Protection Act* (Qld). Two key relevant sections of the Act to Fraser Island dingoes are aspects of duty of care, and cruelty.
- Raised points for consideration during focus groups: Is there a duty of care to wild animals? Is there a duty of care to animals that humans have interacted with? Can a charge of cruelty be brought with regards to wild animals?
- Laws that RSPCA inspectorate is empowered with are under the *Animal Care and Protection Act* – these include seizure, powers of entry, powers to investigate duty of care and cruelty allegations. Clarified that RSPCA only operates under this Act, do not have any powers under the NCA which is what the FIDMS is listed under.
- Some things that are legal may not align with RSPCA policies. In relation to Fraser Island dingoes, our national policy is that human interactions with wildlife should cause as little impact as possible. RSPCA acknowledge sometimes wild animals do need to be managed, and management plans should be justifiable and transparent with clear, measurable and objective outcomes based on science.
- Welfare issues associated with FID that have been raised with RSPCA:
 - Ear tags
 - Radio collars
 - Hazing
 - Trapping
 - Humane killing
 - Health status
 - Care for sick or injured dingoes.

- RSPCA recommendations include: research to be published in peer reviewed journals; human-interaction to be minimised through behavioural modification; advisory committee to be involved in management; and improved communications between stakeholders.

Facilitated Discussion

Ecosure facilitated discussion between workshop participants and the expert panel for 45 minutes following presentations.

In summary there were eight questions relating to managing people; five on managing dingoes; one on research; one on FIWHA values and three general statements. Each question was addressed by the relevant panel member.

The allocated time of 45 minutes was sufficient to provide discussion around the majority of participant concerns.

General themes of questions or concerns voiced by participants during the facilitated discussion session included:

- cultural values of dingoes and historical relationship with Traditional Owners
- World Heritage values of Fraser Island
- sustainability of a wild Fraser Island dingo population
- tourism interests and management
- affects of visitation including concern over the number of 4WD's and risk of dingo strike
- capping of visitor numbers and restricting visitor access
- dingo social structure and potential impacts of culling
- dingo feeding and prey availability
- comparison of current and previous management
- genetic purity of Fraser Island dingoes and potential for breeding programs
- inappropriate visitor behaviour
- human behaviour management and education key
- potential welfare issues associated with direct management i.e. hazing
- legislative framework i.e. classification of native wildlife or pest animal.

Independence of panel members and their role in the FIDMS review was also raised, and clarified by Ecosure as follows:

- Experts selected for the workshop panel are not part of the project team undertaking the review. They were chosen for their specific capabilities to contribute important information relevant to the current strategy in relation to the key issues of dingo ecology, animal welfare, current management and research at the workshop only and have no further involvement in the review.

- This element of the workshop was included to allow for all participants to have access to as much relevant information as possible and thus assist in subsequent group discussion and individual input at focus group sessions.

Focus Groups

Following facilitated discussion with the expert panel, workshop participants were invited to select a key theme and move into focus groups for further discussion. The four key themes of the FIDMS and topics for focus groups were:

1. Managing People
2. Managing Dingoes
3. Research
4. World Heritage, Natural and Cultural Values.

Multiple groups for popular themes were run concurrently, with each group consisting of between four and ten participants and a facilitator from Ecosure or the expert panel. The facilitator's role was to ensure that all participants understood the focus group process and to clarify amongst the group any issues relating to interpretation of the questions posed.

Posters were used to focus group discussion on the effectiveness of each management theme in meeting each of the current FIDMS broad objectives (human safety; dingo wellbeing and welfare; dingo conservation; visitor experience).

A question regarding the effectiveness of each objective had corresponding coloured post-it notes for participants to place in the column that best aligned with their response (very effective, effective; partly effective; not effective; don't know) (Figure 1). Post-it notes allowed for additional comment for discussion amongst the group and consideration in the FIDMS review.

Managing People

A total of 68 responses from 'managing people' focus groups were allocated as shown in Figure 2.

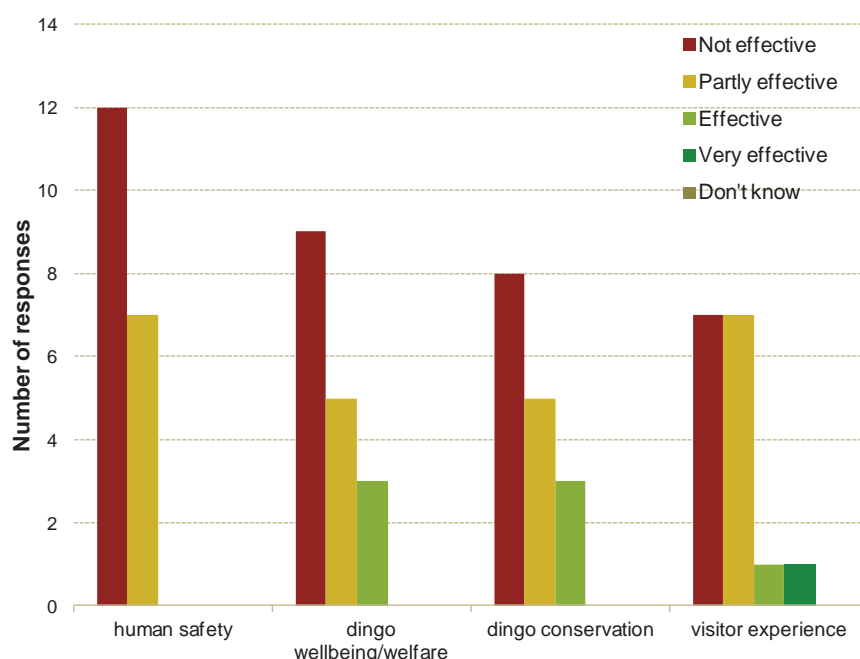


Figure 2 Responses on the effectiveness of the FIDMS at managing people in relation to each key objective

In summary, participants felt the effectiveness of the current FIDMS at managing people's behavior has been:

- not effective (63.16%) or partly effective (36.84%) in protecting human safety.
- not effective (52.94%), partly effective (29.41%) or effective (17.65%) in ensuring dingo wellbeing/welfare.
- not effective (50%), partly effective (31.25%) or effective (18.75%) in ensuring dingo conservation.
- not effective (43.75%), partly effective (43.75%), effective (6.25%) or very effective (6.25%) at providing for positive visitor experience.

Managing Dingoes

A total of 86 responses from 'managing dingo' focus groups were allocated as shown in Figure 3.

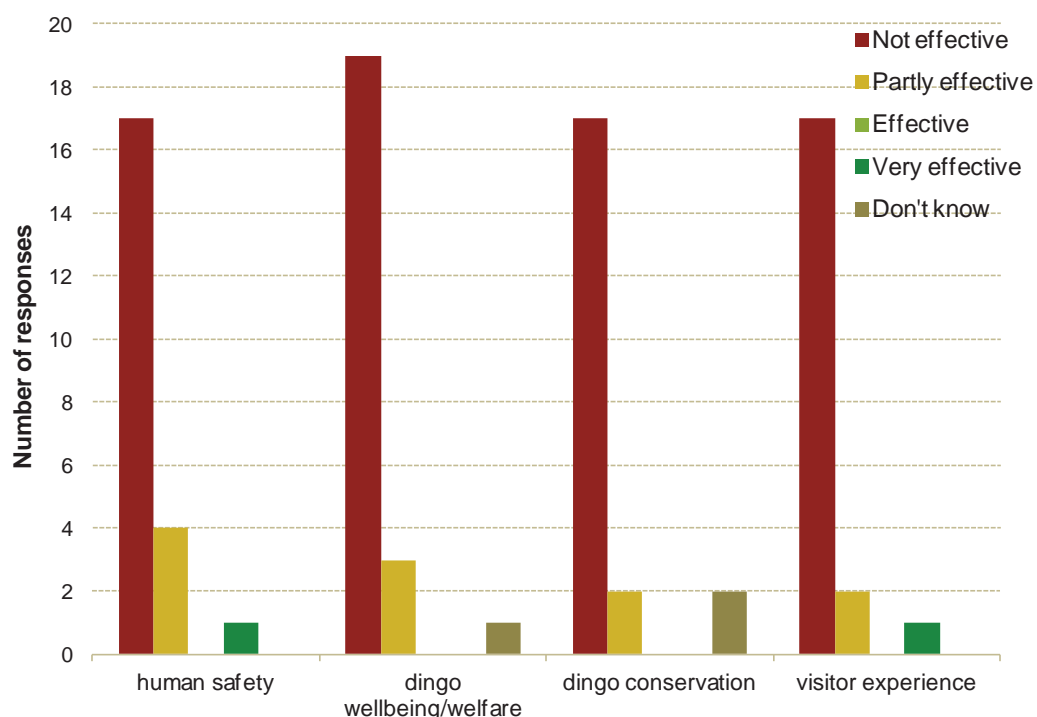


Figure 3 Responses on the effectiveness of the FIDMS at managing dingoes in relation to each key objective.

In summary, participants felt the effectiveness of the current FIDMS at managing dingo behavior has been:

- not effective (77.27%), partly effective (18.18%) or very effective (4.55%) in protecting human safety.
- not effective (82.61%) or partly effective (13.04%) in ensuring dingo wellbeing/welfare with the remainder unsure.
- not effective (80.95%) or partly effective (9.52%) in ensuring dingo conservation with the remainder unsure.
- not effective (85%), partly effective (10%) or very effective (5%) at providing for positive visitor experience.

Research

A total of 59 responses from 'research' focus groups were allocated as shown in Figure 4.

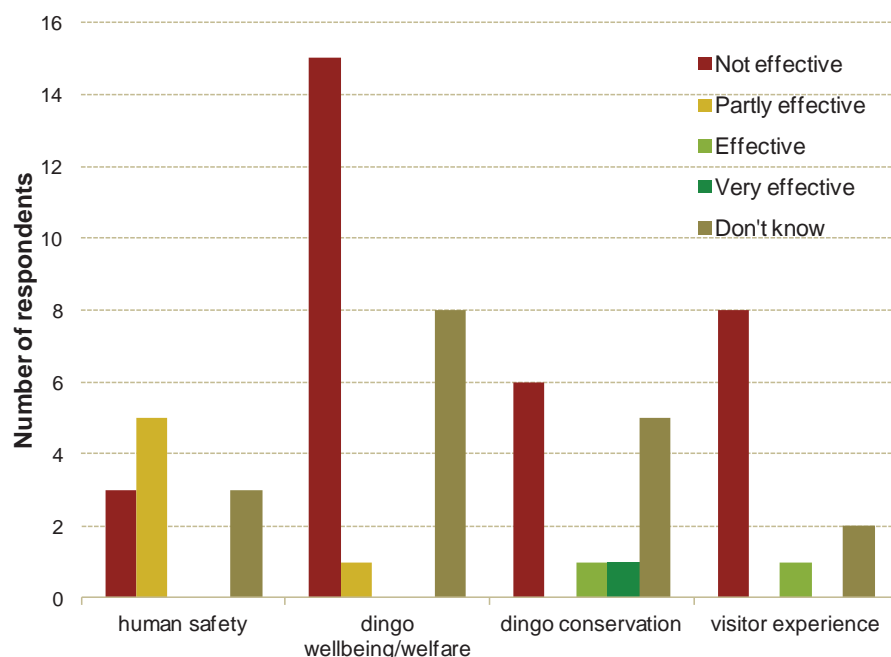


Figure 4 Responses on the effectiveness of the FIDMS at ensuring appropriate research is undertaken in relation to each key objective.

In summary, participants felt the effectiveness of the current FIDMS at ensuring appropriate research has been undertaken:

- partly effective (45.45%) or not effective (27.45%) in protecting human safety with the remainder unsure.
- not effective (62.5%) or partly effective (4.17%) in ensuring dingo wellbeing/welfare with the remainder unsure.
- not effective (46.15%) effective (7.7%) or very effective (7.7%) in ensuring dingo conservation with the remainder unsure.
- not effective (72.73%) or effective (9.09%) at providing for positive visitor experience with the remainder unsure.

World Heritage, Natural and Cultural values

A total of 21 responses from the 'World Heritage, natural and cultural values' group were allocated as shown in Figure 5.

World Heritage, natural and cultural values could not be directly assessed against each FIDMS objective, but rather against the overall protection provided to them by the FIDMS.

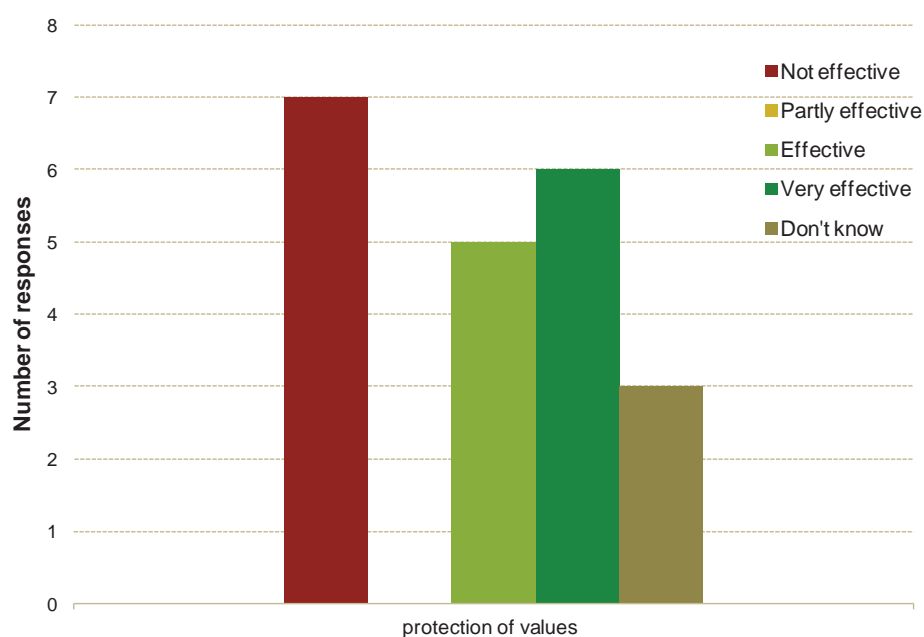


Figure 5 Responses on the effectiveness of the FIDMS at protecting World Heritage, natural and cultural values.

In summary, participants felt the effectiveness of the current FIDMS at protecting World Heritage, natural and cultural values is:

- not effective (33.33%), very effective (28.57%) or effective (23.81%) with the remainder unsure.

FIDMS objectives

A total of 213 responses against the four key FIDMS objectives across all groups (excluding World Heritage, natural and cultural values) were allocated as shown in Figures 6 to 9.

Human safety

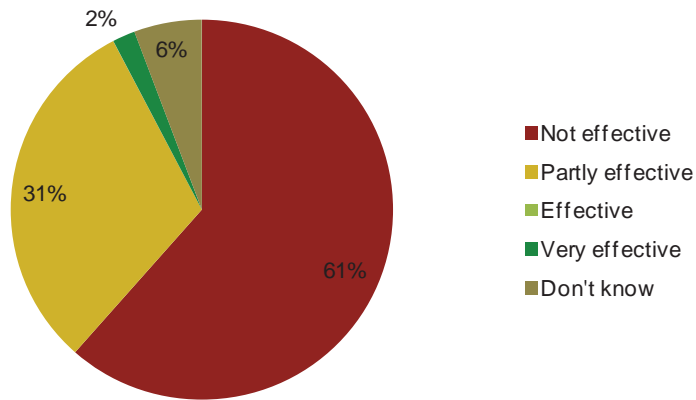


Figure 6 Responses on the effectiveness of the FIDMS at protecting human safety.

Dingo wellbeing and welfare

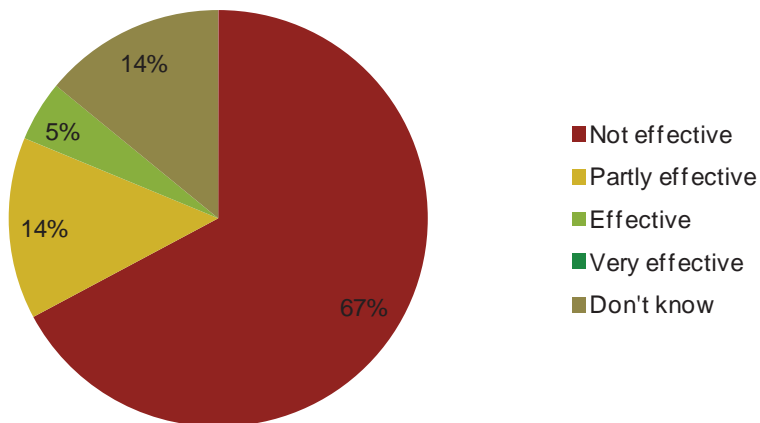


Figure 7 Responses on the effectiveness of the FIDMS at ensuring dingo wellbeing and welfare.

Dingo conservation

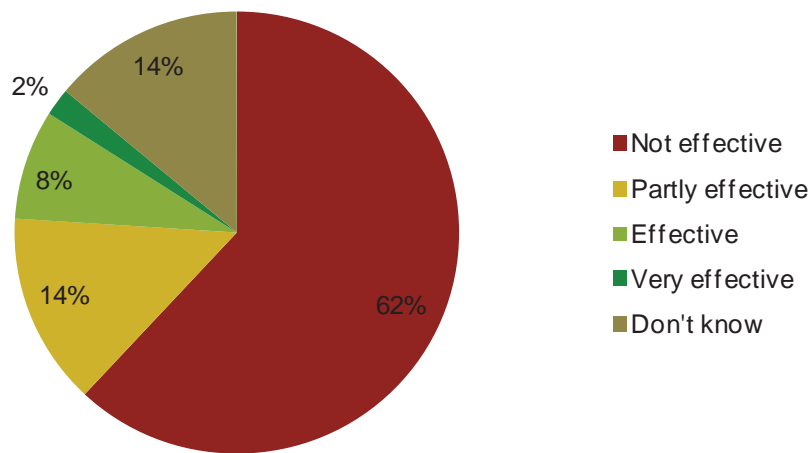


Figure 8 Responses on the effectiveness of the FIDMS at maintaining a sustainable dingo population.

Visitor experience

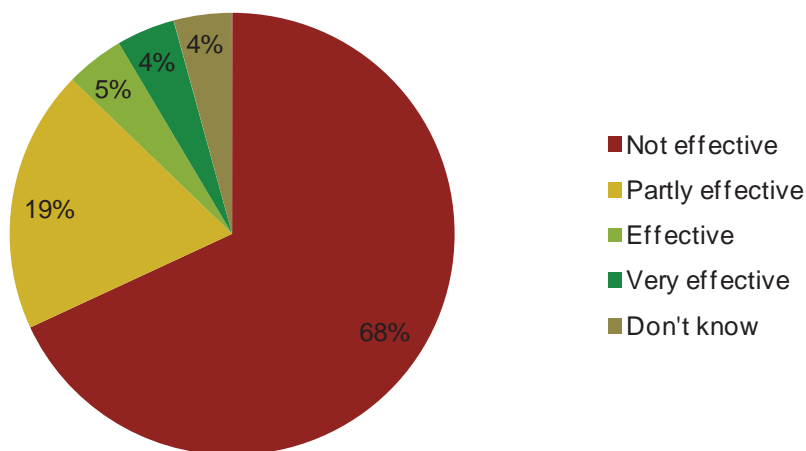


Figure 9 Responses on the effectiveness of the FIDMS at providing safe opportunities for visitors to safely view dingoes in a natural state.

Workshop feedback

An evaluation form was provided to participants seeking comment on the effectiveness of the workshop as part of the engagement process.

In summary, from a total of 35 forms (53.8% of participants) completed:

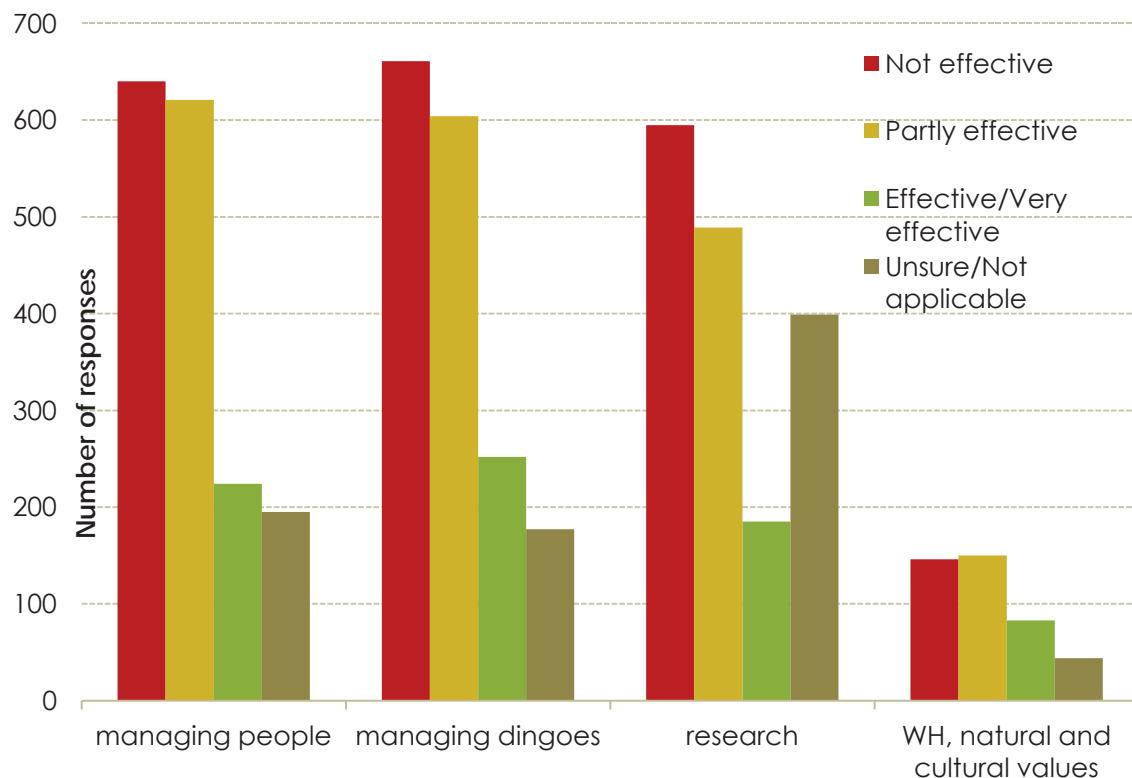
- 41% were completely satisfied and a further 38% were mostly satisfied with the level of information provided by panellists and facilitators.
- 82% completely agreed they were able to contribute fairly and equitably to the workshop, with a further 15% mostly agreeing (one individual not satisfied).
- The amount of time available for the workshop was highlighted as both a positive (plenty of time) and a negative (some participants suggested 2-3 days would have been preferred).
- Most respondents felt they were able to effectively contribute during discussion and focus groups, with many commenting on the effectiveness of the posters during focus groups.
- Common suggestions regarding the FIDMS review and future management included improved stakeholder input (particularly from Traditional Owners and residents), less active management of dingoes, increased focus on education and human management and more research.
- Comment was also made that following clarification through panel presentations and discussion, it is apparent there is false information in the public sphere.

Overall participants felt the workshop was productive, and were positive about their feedback being considered.

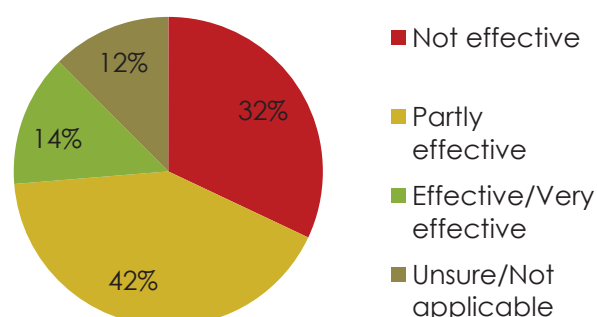
Ecosure would like to thank workshop participants, and will use detailed records of the workshop in the review.

Appendix 11

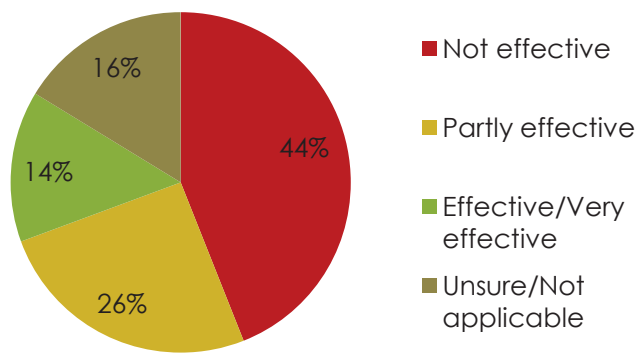
Combined workshop and survey graphs



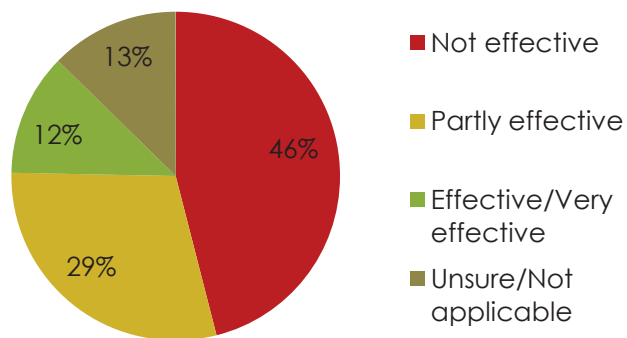
Combined workshop and survey responses for each of the four themes (managing people; managing dingoes; research; world heritage, natural and cultural values) assessing effectiveness against each of the four broad strategies (human safety; dingo welfare; dingo conservation; visitor experience). Therefore each of the total 541 respondents had the opportunity to respond up to four times to each key theme resulting in a total of 5202 responses



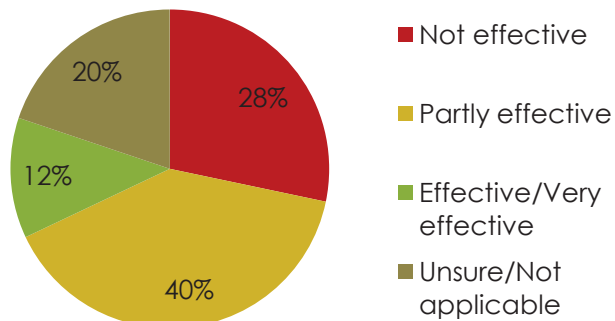
Combined responses on FIDMS effectiveness at protecting human safety.



Survey responses on FIDMS effectiveness at providing for dingo conservation.



Combined responses on FIDMS effectiveness at ensuring dingo welfare.



Combined responses on FIDMS effectiveness at providing for a positive and safe visitor experience.

Appendix 12

Education products and activities

Products or activities that provide pre-visit information to at least some visitors are indicated by an asterisk.

| Product/Activity | Distribution method | Audience | Changes since 2003 |
|--|---|--|---|
| Face-to-face communication by QPWS staff | | | |
| Camper briefings . | Face-to-face delivery by rangers. Usually involves group briefing in late afternoon to all campers at each site visited with more than 3000 camper briefings per year. Briefings occur every weekend (generally Sat & Sun), and every day (afternoons and night) during Easter and during Qld and NSW school holidays. However a substantial proportion of campers do not receive briefings during peak visit times due to limited staff resources. | Campers. Priority rating of different audiences identified according to risk level, and used to guide frequency, duration and content of briefings – for example unfenced campsites are given high priority. | Switch from campground rangers living on site to general duty rangers visiting campsites approximately 2004, mainly to increase cost efficiency. |
| Informal face-to-face contact by rangers. | Face-to-face delivery by rangers. Door-knocking (and letter box drop if not home) of all residents during seasonal campaigns and after selected dingo incidents (see below). | Campers, fishers, individuals encountered by rangers during their patrols, where rangers are concerned about safety. Residents. | |
| Formal presentations, often using Powerpoint delivery. | Specifically organised meetings, or as part of existing meetings. | Commercial tour operators and their guides. Tourist visitor information centre staff and volunteers. Backpacker hostel staff & tag-along tour staff. Special interest groups, including Save the Fraser Island Dingoes, BMRG, Oceanwatch, | Started 2004, last done in 2007. Discontinued since considered too resource intensive considering low numbers attending. Last done in 2007. Discontinued due to low attendance and high cost. Last done in 2011. Last done in 2012. |

| Product/Activity | Distribution method | Audience | Changes since 2003 |
|--|---|---|---|
| | | Qld 4WD Association. | |
| Face-to-face delivery by visitor centre staff*. | | Fraser Island Association Orchid Beach Progress Association. | Last done in 2012. |
| | | World Heritage Area committees. | Last done in 2012. |
| | Detailed information available at QPWS information centres at Rainbow Beach and Tewantin. Non QPWS permit issuing agents provide basic information. | All visitors who book or seek information at visitor centres. | |
| Informal liaison. | Social and community events e.g. weeding days. | Residents. Commercial tour operators. | Ongoing. |
| Brochures and flyers | | | |
| 'The dingoes of Fraser Island – safety and information guide' brochure*. | Included in permit packs for all visitors purchasing vehicle or camping permits (as required for driving or camping on the island). All visitors purchasing permits at QPWS information centre or permit-issuing centres automatically receive these. Those who book online or by phone are asked to pick up permit packs from the mainland QPWS information centre before travelling to the island, but there is no monitoring of the extent to which this occurs. Available at information centres on and off the island. Several posted to local schools. Small quantities provided several times each year to commercial tour operators (especially tag-along tour operators), with encouragement (but no requirement) to distribute to clients. Operators encouraged to request more copies if they wish, and some do so. No information available on number of visitors reading these. | All visitors. Section targeting young children. | Introduced in 2011. |
| 'Fraser Island World Heritage Area and Recreation Area - Visitor Guide' brochure*. | Provided to all visitors purchasing vehicle or camping permit at QPWS information centre or permit-issuing centre. | All visitors. | Introduced in 2005, updated 2011. Combined information previously in separate brochures, reducing costs. |

| Product/Activity | Distribution method | Audience | Changes since 2003 |
|---|---|---|--|
| 'Some dingoes are dangerous' flyer*. | <p>Included in some permit packs for all visitors purchasing vehicle or camping permits as an alternative to, or in addition to, the dingoes of Fraser Island brochure.</p> <p>Barge operators have agreed to hand these to walk-on passengers on certain barge routes.</p> <p>Provided to backpacker hostels, 4WD hire companies, accommodation providers, residents, commercial tour operators when requested and during seasonal dingo education campaigns.</p> <p>Provided to rangers to distribute after camper briefings.</p> <p>There is no information available on the proportion of visitors who receive this flyer through the latter three sources.</p> | All visitors. | |
| Be Fraser-friendly fishers. | Distributed at fishing competition. | Fishers. | 2009 (when last fishing competition was held). Brochure discontinued. |
| Other printed materials | | | |
| "I was dingo aware.." sticker . | Handed out by rangers at their discretion. | Children, young adults and backpackers as reward for 'doing the right thing' | Introduced in 2005. Refreshed in 2012. |
| Dingo-related articles in 'Sand Paper' newsletter. | Postal delivery. Letter-box drops to residents. | Residents & ratepayers. Commercial tour operators & intended to .distribute to guides. World heritage committee members. 4WD associations. | Dingo articles included in almost every edition since 2005, including two editions in 2011. No newsletter in 2012. |
| Conditions Reports* issued regularly as needed, including dingo safety warnings where | Insert to dingo brochures, emailed to permit-issuing centres, on NPRSR website. | All visitors and residents. | |

| Product/Activity | Distribution method | Audience | Changes since 2003 |
|---|--|--|--|
| applicable. | | | |
| Updates to HEMA maps and park related products*. | Liaison. | All visitors. | |
| Other Fraser Island interpretation products* e.g. Great Walks. | | Visitors using specialised interpretation products e.g. trekkers. | |
| Quick response flyer* e.g. 'Warning – aggressive dingo'. | Included in vehicle and camper permit packs. | All visitors. | |
| Notices on functional materials. | On food storage containers, picnic tables etc. | Visitors using these facilities. | |
| Websites | | | |
| 'About Fraser Island Dingoes' NPRSR web pages*. | Continuously available. Various groups referred to website for further information in response to queries, or proactively e.g. in letter sent to local school principals. | All. | Dingo-safe information included in the Fraser Island web page 2003-2010. Dedicated dingo pages created in 2010. Regular additions and updates. |
| Other Fraser Island NPRSR web pages*. | Continuously available. | All. | Dingo pages created 2010. Regular additions and updates. |
| ParksQ camping bookings web pages*. | Continuously available. | Campers booking online. | |
| Tourism Queensland web pages*. | Continuously available. | All visitors. | |
| Audiovisual material | | | |
| 'Great Sandy National Park' DVD* - accompanied by key message translation sheets in seven languages. | Distributed to non-government permit-issuing centres, and QPWS information centres where they are intended to be run on a loop through a variety of safety video segments. Provided to all tag-along tour operators, backpacker hostels, 4WD hire providers to present as part of their | Tag-along tour patrons Backpackers in general Visitors hiring from 4WD providers | 3 major revisions since video available in 2003. |

| Product/Activity | Distribution method | Audience | Changes since 2003 |
|---|--|--|--|
| Mass media | | | |
| 'Brownies Coastwatch' radio segments*. | Aired during peak visitor periods. | All visitors. | Run 2010 No funding currently available for future use. |
| Fish FM interviews*. | Conducted regularly to coincide with fishing competitions 2002-2009. | Fishers. | Last conducted in 2009, coinciding with end of fishing competitions. |
| Media releases and Community Service Announcements*. | Press releases to TV, radio, major print media. Participated in TV film shoots e.g. Get-Away, Catalyst. Every Easter, Spring and Summer school holidays. | All. | Last done in Sept 2012. Community Service Announcement for radio/TV run once during peak visit time – no effect seen so discontinued. |
| Audio announcements | | | |
| Audio announcement by barge operators*. | Presented by barge operators, as requested by QPWS (not compulsory). Included in their general audio announcement during barge departure. No objective information available on the extent to which this occurs, but anecdotal feedback from QPWS indicates it is usually done, but may be difficult to hear at times. Barge operators reminded and resent wording to present at the start of each seasonal campaign. | All visitors arriving at Fraser Island | |
| Signage (includes some posters and plaques) | | | |
| Continued use of a wide range of signage (including plaques and posters). | Large number of outdoor locations on island (including barge leaving and landing points, major and minor tourist nodes, all camping and day use areas, picnic tables, food storage lockers), visitor centres on mainland and island, barges, island accommodation, island shops, mainland accommodation. | All visitors | Gradual replacement with updates to signs 2003-2012 as condition deteriorated, rather than immediately, for resource efficiency. More variation introduced to reduce tendency to ignore. Where necessary and possible, high quality |

| Product/Activity | Distribution method | Audience | Changes since 2003 |
|--|--|--|---|
| | | | stickers updated information on penalties. Last major upgrade in 2010. Continual renewal of outdated signs and development of new signs has continued up to 2012 and should be complete in June 2014. |
| Dingo ID panel added to signs. | Widespread at outdoor locations around Island. | All visitors. | Developed 2004 and gradually introduced to many locations. Adds dingo ID information to previous signage. Updated recently. |
| New Dingo-safe pictograms ('Be dingo-safe', 'Please close the gate', 'No food to lake'). | Mainly at non-formal facilities e.g. along walks. On pedestrian gates to dingo fences. | All visitors. | New small signs introduced in 2005, serving as extra reminders re dingo safety. Also pictogram added to bigger signs. |
| New 'Dingoes roam this area' sign series and dunny door posters. | Widespread at outdoor locations around Island. | Some for all visitors. Some designed for specific audiences, including: visitors and residents with children, campers, fishers. Visual images convey safety messages to non-English speaking audience. | New sign series introduced in 2005 in new format with vivid images. Adds dingo ecology information to previous signage. Adds communication to non-English speaking audience. Also mentions penalties. |
| New metal sign series 'Dingo encounters' and 'Dingoes'. | Mainland entry points, high risk areas. | All visitors. | Introduced in 2004. |
| New sign series and dunny door posters 'Remember when on Fraser Island...' *. | Toilet doors at park sites, barges, resorts, townships, popular camping zones for fishers. | All visitors Fishers (dunny door sign focusing on fishers). | Introduced in 2011. |
| New barge signs*. | Barges. | All visitors. | Upgrades and replacements as needed in 2003, 2006, 2007, 2011. |
| New site-specific danger and warning signs e.g. 'Aggressive dingo in the area' temporary sign. | High risk sites (temporary or ongoing). | All visitors or targeting specific audience at site e.g. families visiting Binnigh Sandblow. | Introduced 2006. |

| Product/Activity | Distribution method | Audience | Changes since 2003 |
|--|---|---|--|
| New 'Dealing with dingoes' signage. | Not yet distributed, awaiting approval. | | Under production. Awaiting outcome of 2012 review. |
| Dingo-safe fridge magnet posters. | Distributed to residents and accommodation houses as a special item during one of the dingo education campaign face-to-face exercises. | Residents. Accommodation providers. | Once only initiative, during spring 2009 dingo education campaign. |
| Other activities | | | |
| Seasonal 'campaigns' during peak visit times - intensive education initiatives using variety of distribution methods. | Increased face-to-face contact & distribution of brochures (including mail-outs), various other educational activities as identified in Statement of Interpretive Intent for each campaign. 2-3 times per year, during Easter and school holidays. | All, including residents, all island accommodation providers, barge operators, airline, all commercial tour operators. Targets specific audiences according to recent compliance issues identified. | Started 2006. |
| Ranger training - workshops to inform of latest products, obtain feedback, train in public delivery. | Internal delivery. | Fraser Island rangers. | |

Appendix 13

QPWS staff interview responses

The following is a summary of the perceptions and opinions expressed and solutions suggested by respondents to the QPWS staff interviews. Responses have been re-ordered and grouped to fit within the management effectiveness evaluation framework. (Outputs are detailed within the body of the report).

Outcomes

- More than 90% of visitors are considered to have appropriate **awareness of dingo behaviour**, based on rangers' anecdotal experiences of verbal comments by visitors. More than 90% of visitors are considered to be **alert to dangers**, based on rangers' anecdotal experiences of verbal comments by visitors and observations of visitor behaviour. However, rangers report that many visitors believe that only small children are vulnerable, whereas they believe there is an increased risk for all children up to about fifteen years of age, and depending on their behaviour around dingoes. More than 95% of visitors are believed to **refrain from deliberate feeding** of dingoes, based on rangers' observations of the behaviour of dingoes around campers and very few reports of this occurring. More than 90% of visitors are believed to **behave safely around dingoes**, although this remains a concern and the main concern is the behaviour of teenagers. Many visitors **report dingo incidents and describe dingo characteristics** which are usually helpful in identifying individuals, although rangers believe that this often does not occur. They believe visitors are reluctant to report incidents due to fear of dingoes being destroyed or of being prosecuted for their own behaviour, and in many cases do not notice dingoes in the vicinity. An estimated 80% of visitors are perceived as complying with the objective of **refraining from inadvertent feeding**, based on rangers' anecdotal observations. Rangers perceive that most visitors try to behave appropriately, but many do not realise the importance of not inadvertently feeding especially in relation to dealing appropriately with rubbish. This is suggested to be due to lack of knowledge on what to do, and this being difficult to achieve. Only about 69% of visitors are considered to have **enjoyable experiences of viewing of dingoes**. The main reasons for lack of enjoyment are seen as fear of attack or of dingoes being destroyed, with lack of sufficient sightings being a less common reason. While staff views varied on the extent to which the **risk posed to humans** and the **incidence of aggressive or destructive behaviour** could be considered acceptably low, all agreed that management practices had been very effective in reducing this risk. Visitor compliance is believed to be due almost entirely to education (which might include the deterrent value of educating them about penalties) rather than enforcement, since rangers report they are doing very little enforcement, and have directly observed many instances of change to compliant behaviour once visitors are educated face-to-face. Many commercial tour operators have provided verbal feedback at QPWS information sessions indicating that they consider educational materials to be effective.
- Audience groups for which there are perceived to be significant problems with compliance regarding dingo-appropriate behaviour are:

- (Fishers (especially those with a long history of fishing at Fraser Island) - occasional inadvertent feeding; mainly a seasonal problem associated with emergence of young pups. The problem has greatly reduced due to concerted education efforts targeting this group and designed to overcome misconceptions. No further solutions were seen as feasible.
- Tag-along tour groups (high visitor numbers and intensity of use of certain sites). Independently travelling backpackers in hired 4WDs – inadvertently feeding and sometimes encouraging dingoes. The size of this group is thought to have decreased greatly since tag-along tours emerged. No further solutions were suggested.
- Residents (including Island workers and resort staff) – thought to comprise a very small number of individuals who continue to deliberately feed dingoes, but even these have the potential for a massive negative impact. Although reduced in frequency (due largely to increased community engagement initiatives), there have been recent incidents of deliberate feeding. (S, R). Rangers perceive that only about half of Fraser Island residents support QPWS management of dingoes, whereas managers believe the majority are now supportive. The key factors leading individuals to deliberately feed are thought to be lack of belief in a connection between feeding and aggression, experience of having fed dingoes in the past without apparent problems, and cultural beliefs supporting feeding of dingoes. A suggested solution to minimise this is enhanced community engagement efforts by QPWS.
- Teenagers – who often walk alone or otherwise do not behave safely around dingoes. Certain commercial tour operators who are reported to drive their bus close to dingoes to allow guests to take photographs, thus promoting habituation. Rangers cite evidence of a dingo pup who was run over by a bus, due to its mother becoming thus habituated.

Education

Context

- No significant changes in context were suggested that might justify additions or changes to the introductory sections of the FIDMS or Communication Plan.

Planning

- Consider adding a new objective to the FIDMS relating to fostering increased public understanding and appreciation of dingo management issues and practices. Suggested avenues for achieving this were publication of QPWS dingo research data and increased delegation of authority to regional level for input into public media.
- Consider adding a new objective to the FIDMS: "Public appreciation of the dingo as a wild native animal, and its role in the ecological community", subject to avoiding adding further actions to the FIDMS.
- With regard to the FIDMS objective "Provide visitors with a safe, enjoyable opportunity to view dingoes in an environment as near as possible to their natural state", rather than being treated as a stand-alone objective, the visitor enjoyment component should be an objective only to the extent that it does not conflict with the other FIDMS objectives, which were considered of higher priority. Thus the education strategy should include efforts to manage public expectations regarding their dingo-viewing experience on Fraser Island. Delete the phrase "as near as" in the above objective, as this is now feasible.

- Move from the current reactive approach of QPWS of responding to negative community reactions, towards a more proactive approach of informing the public about dingo management issues. Modify the existing education message about the nature of dingoes in order to foster enhanced public appreciation of the dingo as a wild native animal, and its role in the ecological community. Make clear that dingoes are capable of killing anyone, to overcome the common perception that “it won’t happen to me”.
- Add an education message to actively discourage dingoes when they approach camping areas. Rangers report that although the “official” education message is to ignore such dingoes, they often verbally advise people to use a projectile like a stick to chase these dingoes away. They report observing that this is successful in making dingoes more likely to avoid the people who do this (and therefore enhance their safety) and have not observed any evidence that it makes some dingoes more prone to becoming aggressive, nor that it makes them less likely to subsequently approach other visitors.
- Design educational messages (especially signage) to more fully explain the link between people feeding dingoes and aggression to people, and to explain that only some dingoes that are habituated become aggressive. This needs to overcome people’s perceptions arising from their experience of pet dogs. This could make use of international examples, and/or individual cases of serious dingo incidents that have occurred on Fraser Island. Expand the education message asking visitors to report dingo incidents, by explaining that (a) contrary to common perception, reporting incidents early on can save a dingoes life (so that non-lethal action can be taken before a dingo becomes dangerous and has to be destroyed); (b) reporting dingo incidents is important to the safety of other visitors.
- Some degree of flexibility in face-to-face delivery of dingo education messages by rangers is appropriate (such as the relative emphasis on education vs enforcement; fear vs respect of dingoes) to cater for different audiences.

Inputs

- Increased resources would allow more effective implementation of the FIDMS in terms of education. Staff resources available for public contact (especially through ranger briefings) are the most critical component of this. The number of rangers on Fraser Island has been approximately doubled to enable dingo-related management, but still allows for only about eight rangers on the Island at any one time. Staff differed in their perceptions of whether staff resources dedicated to public contact had remained approximately constant or had declined since 2001. Logistics on Fraser Island, rather than staff numbers per se, are the critical problem in lack of staff resources. These days most rangers live off the Island and so are unable to work in the evenings (when campground briefings are most effective) unless paid overtime.
- Rangers all expressed strong views that recent loss of an administrative position at the Eurong office (the only office-based position on Fraser Island which had provided the opportunity for public contact) had led to a major decrease in the level of public contact.

Actions

- Actions in the FIDMS, Communication plan and Implementation Schedule are generally considered appropriate and adequate, subject to the point below. However visitor surveys every few months are not practicable.
- Views differed on whether the number of actions in the FIDMS (in general, and in relation to education) should be reduced or maintained. One view was that they should be

reduced and that instead there should be a shift towards appropriate ongoing processes (in the case of education, primarily the Communication plan and 2010-2015 Implementation Schedule) for determining detailed actions, while still maintaining accountability. The following reasons were given: (a) carrying out so many actions with limited resources spreads QPWS effort too thinly; it would be better to carry out fewer actions more thoroughly, (b) this would allow for greater flexibility in response to changing demands and priorities. that the contrasting view was that the current actions and their number should be maintained in the FIDMS because this would help ensure they are implemented and appropriately resourced.

Processes

- Face-to-face contact with rangers, and secondly community engagement by senior QPWS staff, are believed to be by far the most effective communication methods. Anecdotal evidence for this comprises verbal feedback from members of the public and commercial tour guides.
- The “Dingoes of Fraser Island” brochure and the dingo component of the Visitor Information Guide are considered very valuable by all respondents, and its continued distribution considered important. Compliance with dingo-appropriate behaviour is perceived by rangers to have increased due to repeat visitors and in response to distribution of the Dingoes of Fraser Island brochure. Evidence of its effectiveness is based on rangers’ anecdotal experience of: (a) children adopting the behaviour displayed in the brochure, (b) observations of families reading the brochure, (c) children correctly answering questions from the brochure, and (d) many visitors asking for additional copies. Tag-along tour guides also provided lots of positive feedback on this brochure.
- Signage is considered useful, based on rangers’ reported frequent observations of people reading the signs, and the fact that it provides a 24hour message service. On the other hand, signage is reportedly often ignored. Education by commercial tour guides, including tag-along tour guides, is considered important, as it has the potential to reach a large number of visitors. Rangers reported that after tag-along operators were required to show an educational video containing dingo messages to their guests, compliance greatly increased.
- Interpretive materials are perceived as sufficiently up-to-date and of good quality.
- Although distribution of interpretive materials is wide, this is limited by available funds e.g. QPWS are not able to provide sufficient brochures to tour operators to distribute to all their clients, brochures are reportedly no longer sent out to visitors when booking online or by phone. Rangers were particularly concerned that this means that many campers arrive without appropriate straps to protect their eskies from dingoes. Even when provided with brochures, it is thought that some tour operators choose not to distribute these to guests – a suggested solution is to include this as a legal requirement. A solution for reaching more visitors is to establish a visitor centre, which is also considered appropriate for a World Heritage Area. Central Station is the ideal location as more than 90% of Island visitors go there - more than anywhere else on Fraser Island. As a minimum this should comprise an interpretive plaza with appropriate traffic arrangements. An alternative although less effective option would be to include appropriate interpretive displays in several mainland visitor centres.

Main obstacles and solutions to conducting communication effectively

(potentially spans all stages of the management effectiveness evaluation framework, though responses related to context, processes and inputs)

- Beliefs and attitudes of some visitors and other members of the public in relation to dingoes and their management that conflict with those of QPWS. This is believed to be due mainly to (a) dissemination of messages that are contrary to those communicated by QPWS by some community groups and individuals who oppose QPWS dingo management, particularly through social media and local news media; (b) perception of dingoes as pests on the mainland; (c) cultural resistance of some individuals to QPWS education messages; (d) perceived bias among certain traditional media outlets; and (e) anthropomorphic images of dingoes promoted by certain captive wildlife facilities. Solutions: input into social media (including appointment of a full-time social media person), more input into traditional news media, more proactive community engagement, publishing QPWS dingo research, increased delegation of authority to regional level (in particular to allow input into local news media and social media), encourage the silent majority to speak out in support of FIDMS, increased high-level government support for the FIDMS, education at local schools (underway but hampered by lack of resources) especially training teachers to deliver.
- Apathy of some visitors regarding: dangers of dingoes, failure to take responsibility for their own safety, not perceiving dingoes to be of conservation value. Solutions: enhanced education.
- Some tour operators not sufficiently communicating dingo education messages to their guests. Rapid staff turnover of tour guides adds to the problem of providing effective education to them. Solutions: include in permit conditions, provide additional education to tour guides, increased engagement by QPWS.
- Especially during peak visitor times, staff resources are insufficient for face-to-face contact (which is believed to be the most effective way of ensuring compliance) with large numbers of visitors. One ranger estimated that at peak times, more than half of visitors are not briefed. Solutions: increase rangers during peak times by secondment from other parks, engage additional staff dedicated to public contact and social marketing. Major diversion of staff time into responding to Ministerials and away from other duties including effective face-to-face education, resulting from opposition to QPWS management of dingoes from some community sectors.
- Lack of QPWS ability to respond in a timely fashion to inaccurate information in social media regarding management of Fraser Island dingoes, due to current government media policy.
- Low staff morale among many rangers due to high workloads, inadequate resources and vocal opposition to QPWS dingo management, which all increase staff turnover rates and may indirectly influence their effectiveness. A reported plan to discontinue production of visitor brochures containing dingo safety messages. Solution: Continue printing and distribution of these brochures.

Enforcement

- The effectiveness of enforcement in directly contributing to visitor compliance is thought to be minimal, since rangers report they are currently doing very little enforcement. (S,R) On the rare occasions that people are verbally warned about penalties, rangers' anecdotal reports indicate that this aids in increasing compliance.) However, the

deterrent value of enforcement may be significant (but is unknown). One ranger perceived that since enforcement efforts had reduced over the last few years, compliance with food and rubbish security had also declined.

- Solution: One ranger suggested that there be an occasional “blitz” of increased enforcement actions, but others did not support this, as they were concerned about wanting to foster a positive relationship with visitors.)

Context

- No significant changes in context were suggested that might justify additions or changes to the introductory sections of the FIDMS.

Planning

- No changes to objectives, principles, focus or strategies were suggested. Actions in the FIDMS are considered generally appropriate and adequate.

Inputs

- Limited resources for public contact reduce the effectiveness of enforcement (see Education responses for details).
- Some respondents believed that some rangers do not have adequate capacity to conduct enforcement as effectively as is desirable. It was suggested that additional training and support is needed to build this capacity, which has recently commenced through appointment of a senior compliance officer with an enforcement background.

Processes

- Record keeping for enforcement is considered limited and often inconsistent. Subject to resources, plans are underway to increase standardisation with the use of new computer technology.

Main obstacles and solutions to conducting enforcement effectively

(potentially spans all stages of the management effectiveness evaluation framework, though responses related to processes and inputs)

- Lack of clear enforcement capability outside the protected area estate. Solutions: Collaborate with local council to develop bylaws to prohibit deliberate and inadvertent feeding of dingoes, complete fencing of K'gari campground.
- Opposition to QPWS management of dingoes from some community sectors, particularly through social media. Solutions suggested are as for this issue in relation to education.
- According to rangers, they have become more reluctant to issue penalties in recent times.
- because they perceived that this was important to building or maintaining public support for the FIDMS. However they expressed concern that this may contribute to a decrease in public compliance with dingo-related legislation, leading to an increased risk of aggression by dingoes towards humans. Inadequate capacity of rangers to conduct enforcement effectively. Solutions: increase training of rangers in enforcement, appointment of enforcement professionals as opposed to use of existing rangers.

Appendix 14

Education messages

This appendix summarises plans and recommendations relating to the content of educational messages to be conveyed by the education strategy. In some cases these have been re-structured or paraphrased for conciseness or to add structure.

2006 FIDMS

The strategy specifies the following messages, and cites further information given in the Communication plan 2004 (Beckmann 2004):

“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.

Communication Plan (Beckmann 2004)

Primary communication focus: safety of people and sustainability of dingo population. Human safety, especially safety of children, is paramount. Since dingoes that attack, are habituated or attracted are at risk of euthanasia, avoiding this is essential to dingo sustainability. The security of food and food-like wastes is essential to minimise attraction and habituation to humans and their living areas.

Overarching concept: Be dingo-safe

Goal of plan: People living, working or visiting Fraser Island be:

- a. **Aware** of natural dingo behaviour, including likelihood of habituation, attraction and potential aggression towards humans
- b. **Alert** to the potential dangers that dingoes may pose, especially towards children
- c. **Active** in behaviours that minimise risk (sub-categories added by present author)
- d. refrain from deliberate feeding
- e. refrain from inadvertent feeding including availability of other human sources
- f. behave 'safely' around dingoes, including stay with children, walk in groups, reactive behaviour if dingoes threaten or attack
- g. **Attentive** to individual dingo characteristics for identification purposes.

Additional desirable outcomes of communication:

- people see dingo sightings as a special event
- people are supportive of efforts to tell them about dingoes
- people are included in monitoring and research into the effectiveness of dingo communication strategies
- people are supportive of dingo management efforts.

Message themes

- a. protecting children – why and how
- b. staying safe – how to behave around dingoes
- c. safeguarding food – avoid access to food, rubbish, scraps, bait and burly
- d. understanding dingoes – respect them as wild animals of national significance.

'Examples' of **extended messages** under each of these themes are given. For example, under the theme 'Understanding dingoes', suggested extended messages are:

- dingoes are naturally lean, even skinny
- if dingoes approach your food, do not move away as this reinforces aggressive behaviour, so instead you should 'safeguard food'.

Review of 2004 Dingo Communication Plan (Environmetrics 2009)

Recommendations for additional messages:

- counter myths and misconceptions about dingoes
- present current information about dingo ecology
- provide more context and rationale for the FIDMS, to ensure understanding.

Appendix 15

Summary of Fraser Island visitor survey 2012 (summarised from Deborah Wilson Consulting Services 2012)

This report was commissioned by QPWS and conducted by a consultant.

Stated aims (however, methods go beyond this):

- Provide current information on visitor understanding and perceptions of dingoes on Fraser Island before their visit and immediately after their visit.
- Gauge visitor knowledge and attitudes to dingoes on Fraser Island.
- Seek feedback from tour operators on their views about visitor knowledge and their experience with visitors in terms of information sought by visitors.
- (Provide demographic information on visitors – unstated but included).

Methods

- Self-completion survey form for visitors. Pre-visit (n=304) and post-visit (n=298) on barge to and from Fraser Island around Easter 2012. Equivalent questions for pre and post visit.
- Face-to-face and some telephone interviews using a structured questionnaire with 11 tour operators/ tourism businesses (tour/4WD operators, hostels) - structured interviews with 11 tourism operators (tour/4WD operators and hostels) regarding their perceptions of visitor knowledge and behaviour, materials they use and find useful, perceived most important education messages, suggested improvements (questionnaire included in the report).
- Compared results with those from 2003 Evaluation of Dingo Education Strategy (for qs that are the same).
- Copy of survey questionnaire and interview questions included.

Findings

Responses to all questions reported. Visitor survey covers: demographics etc, nature and sources of information pre and during visit in general and on certain dingo messages, whether info considered sufficient, beliefs and attitudes re dingoes and appropriate behaviour, perceived importance of following dingo rules, reactions to dingo education messages, whether they adhered to dingo-appropriate behaviour.

No formal conclusions or recommendations given in the document, but the following conclusions are stated or can be readily drawn:

- There was a high level of contact/readership of diverse sources of QPWS information.
- The most common main sources of information about Fraser Island visitors reported pre-visit were (in order): talking to friends & family (34%), travel guide or travel book (30%) or previous visits (25%), mainstream media (19%). Social media sites were the main pre-visit source for 11% of visitors. The main sources of information on the Island were: signs (51%),

tourist or QPWS information centre (49%), accommodation place (34%) and rangers or QPWS staff (27%), brochures on the barge (21%). When arriving, 62% of visitors said they had seen or heard of warnings or rules on how to behave when encountering dingoes, increasing to 70% of visitors on departure.

- However some visitors had not received information or would have liked more information – especially members of tour groups and people booking online. 29% of all visitors indicated they had not received any information, and another 31% said they needed or wanted more. 68% of visitors did not receive a permit pack containing brochures by the time they left the Island. Of those who received brochures, 60% of people read them by the time they left but only 36% before arriving. 42% of visitors said they would like to find out more about dingoes from rangers.
- Many visitors responded 'correctly' (according to QPWS messages) to dingo knowledge questions. However more than 20% of visitors believed the following statements, even post-visit:
 - Parents should keep small children close, but older children are safe by themselves
 - Dingoes that look thin are likely to be very hungry
 - Walking alone on or near the beach is not a risk for adults
 - Fraser Island dingoes are becoming extinct (18%) or are unsure
 - Further, more than 20% of visitors, both pre and post visit, were not aware that there are large fines for feeding dingoes or leaving food or rubbish lying around, or that some campsites have food lockers for securing food. Both before and after their visit, less than 30% of visitors believed the statement that 'the dingoes of Fraser Island are becoming extinct' was false.
- Most visitors had a positive response to receiving dingo education. 89% of visitors surveyed pre-visit said that following rules on how to behave when encountering dingoes was very important.
- Knowledge and exposure to dingo messages increased pre to post visit
- Tour operators and businesses supported the provision of information to visitors by QPWS and understood the key messages. They reported that visitors are generally receptive to advice about how to behave near dingoes. They believed that while Australian visitors have some knowledge of dingoes (and sometimes misconceptions), international visitors have little or no knowledge. They also identified misconceptions of some visitors. They thought a more visible and positive ranger presence is needed on the Island. Other recommendations for changes made by operators.
- Overall, education strategy has had positive important outcomes. But areas for improvement.
- Comparison between 2003 – 2012 results given in the report only as % responses. No statistical analysis was possible, given the lack of raw data available for the 2012 survey. Comparisons were limited by the number of questions in common between the two surveys. As an example, the table below shows details of the results for comparison of knowledge questions for the post-visit survey. The following is a summary of the results of a comparison for both the pre-visit and post-visit responses, unless stated otherwise.

Knowledge questions

These results (Table below) are based on a revisit of the results for each survey, rather than on

those reported for the comparison in Deborah Wilson Consulting Services (2012), since the latter summary was incomplete.

- Increase in 'correct' responses for 5 statements: 'it is important to store food carefully', 'walking alone on or near the beach is not a risk for adults', 'dingoes are very much like pet dogs', 'it is OK to go close to dingoes to get a good photo', 'my group took special care in storing food'. Also increase in percentage of respondents stating 'dingoes are very dangerous' (desired response direction not specified).
- Decrease in 'correct' responses for 6 statements: 'dingoes that look thin are likely to be very hungry' 'walking in groups is recommended....' (pre-visit difference only), 'there are large fines for feeding dingoes', 'there are large fines for leaving food or rubbish lying around', 'dingoes can open ice boxes', 'parents should keep small children close, but older children are safe by themselves'.

Attitude questions:

- Increased number of positive responses in 2012 for: 'fences around most campsites and picnic areas would make me feel much safer', 'I would like to find out more about dingoes and the Island from rangers'.
- Decreased number of positive responses in 2012 for: 'the signs about dingoes were the most useful way of finding out what to do', 'the campsite rangers telling me about dingoes were the most useful way of finding out what to do'.
- *Sources of information, pre-visit* (note that 2012 survey listed many new options, so data are not readily comparable).
- Increased in 2012: talking to family friends workmates, from ranger or QPWS information centre staff, own knowledge from previous visit.
- Decreased in 2012: signs posters or displays, permit pack brochures about dingoes (21.0 % to 7.9%).

Recommendations

- Continued provision of information about dingoes on Fraser Island by QPWS is important.
- It is important to consult with industry about any new QPWS educational material.
- Next visitor survey recommended for 2014/15, to include eastern entry point.

The higher percentage of 'correct' responses is shown in bold. 'Correctness' of response is as designated in the methods of the original visitor survey (Environmetrics 2003), which apparently reflect the desired responses according to QPWS educational messages.

Comparison of responses to knowledge questions

| Test statement | 'Correct' response ¹ | Percentage of desired responses | |
|--|---------------------------------|---------------------------------------|---|
| | | 2003 visitor survey, post visit n=107 | 2012 visitor survey, post visit n=278 approx ² |
| It is important to store food carefully | True | 94 | 96.2 |
| Parents should keep small children close, but older children are safe by themselves | False ¹ | 58 | 54.0 |
| Walking alone on near the beach is not a risk for adults | False | 65 | 73.6 |
| Dingoes are very dangerous (desired response not specified in original survey methods) | True ¹ | 48 | 59.0 |
| Some campsites have food lockers where food can be secured | True | 54 | 50.2 |
| My group took special care in storing food | True | 76 | 84.9 |
| Dingoes that look thin are likely to be very hungry | False ¹ | 79 | 67.8 |
| Dingoes are much like pet dogs | False | 82 | 92.7 |
| Walking in groups is recommended on the Island... | True | 89 | 89.0 |
| There are large fines for feeding dingoes | True | 82 | 74.9 |
| It is OK to go close to dingoes to get a good photo | False | 88 | 90.6 |
| Dingoes can open iceboxes | True | 76 | 56.6 |
| I know enough to tell my children how to behave... | True | na | 78.2 |
| I don't know enough about wild dingo behaviour yet | False | na | 52.3 |
| There are large fines for leaving food or rubbish... | True | 76 | 69.8 |
| Dingoes on Fraser Island are hunters and can find natural food to sustain themselves | True | na | 85.7 |

- 1 Although perhaps considered correct in terms of QPWS dingo management, whether or not this statement is correct is controversial and is not well supported by evidence, and/or the statement is poorly worded and difficult to interpret. Therefore results for this statement should be interpreted with caution, and the statement should not be used in future surveys.
- 2 Exact number varies for each statement.

Appendix 16

Incident reporting categories (Source: QPWS)

Dingo Activity Categories

| Category | Threat to life and property | Attributes | Management action |
|--|--|---|--|
| Code A. Avoidance or wary | Nil | <ul style="list-style-type: none"> • finds the presence of humans threatening • difficult to observe • wild, 'natural' behaviour • avoid people areas within territory | Nil |
| Code B. Habituated IMMEDIATELY: <ul style="list-style-type: none"> ▪ Notify SR / RIC ▪ Fill in the Dingo incident form ▪ CODE B fax sheet ▪ Fax <i>Incident form</i> to Col Lawton ONLY | Nil | <ul style="list-style-type: none"> • non-aggressive • not wary of humans* • dingoes using common areas to humans, using campgrounds as thoroughfares • Curious* | Nil > continue to monitor, aversive conditioning/haze if assessed as necessary |
| Code C. Nuisance or problem IMMEDIATELY: <ul style="list-style-type: none"> ▪ Fill in the Dingo incident form — <i>fax to Mbo office. (locky, cheryl, col, mary,)</i> ▪ CODE C fax sheet ▪ Fax to all listed on the fax sheet | Harassment | <ul style="list-style-type: none"> • loitering at recognized visitor sites* • stealing food & property* • soliciting food* • being fed • living under infrastructure* • following closely* • dingo activity associated with human presence* | Immediate aversive conditioning/hazing using appropriate procedures with strict monitoring and follow-up. |
| Code D. Aggressive IMMEDIATELY: <ul style="list-style-type: none"> ▪ Notify SR / RIC ▪ Fill in the Dingo incident form — <i>fax to Mbo office. (locky, cheryl, col, mary,)</i> ▪ CODE D/E fax sheet — Preliminary Advice — Major issue/ incident <ul style="list-style-type: none"> ▪ Fax <u>Preliminary Advice</u> to all listed on the fax sheet | Major harassment / confrontation. High risk of injury with potential to move rapidly to Code E. | <ul style="list-style-type: none"> • growling / snarling • dominant/submissive testing * • stalking* • tent ripping • clothing ripping* • circling * • dominant toward humans • incorporate humans into pack behaviour* • humans regarded as competitors for resources | Assessment and appropriate action: Haze and intense monitoring if mild intensity and severity (for sub adults) Humane destruction if severe / intense and developed behaviour |
| Code E. Dangerous IMMEDIATELY: <ul style="list-style-type: none"> ▪ Notify SR / RIC ▪ Fill in the Dingo incident form — <i>fax to Mbo office. (locky, cheryl, col, mary,)</i> ▪ CODE D/E fax sheet — Preliminary Advice — Major issue/ incident <ul style="list-style-type: none"> ▪ Fax <u>Preliminary Advice</u> to all listed on the fax sheet | Threat/ immediate danger to person | <ul style="list-style-type: none"> • nipping* • biting* • bailing up / ambushing* • lunging* • attack* • casualty • hunting tactics: fast approach/ pack action all dependant upon severity and intensity.* | Identification and humane destruction following approved procedures. |

* refer to glossary of terms for further definition.

Process (as outlined by manager Great Sandy)

- **Document behaviour**
- **Decision — RIC or in their absence, SR**
- **Authorised shooter in any dangerous situation.**

Glossary of Terms

Category B

Non-aggressive – Animal activity can be associated with human activity with animals in close proximity to people. Animals may show interest in people but no aggressive behaviour towards people.

Not wary of Humans – Dingoes will undertake normal activities with no consideration of number and proximity of people. Direct interaction between persons and animal is uncommon, and if so, will result in dingo retreating or moving away quickly.

Curious – Animal is inquisitive, actively watching the actions of people from within 50 metres. Will move away after a couple of minutes or when approached. *Distinguish from 'loitering at recognised visitor sites'.*

Category C

Loitering at recognised visitor sites – Animal will spend extended periods of time within campground, townships or day use areas, usually looking for food and will not be deterred away from site easily when approached, or returns within a short period of time (<5 minutes). Usually associated with *'Dingo activity associated with human presence'* (see below). *Distinguish from 'Curious'.*

Stealing food and property - Animal takes food or property from a person's camp. Persons in camp have made no attempt to deter animal due to lack of presence or failing to be aware of animal's presence. When and if confronted animal will move away. Animal may come back.

Soliciting Food – Animal makes appeal for food by persistently raising nose to sniff, not moving away any great distance. This can include sitting and watching intently nearby (closer than 30 m) while people are eating or preparing food. Animals may steal food if not closely watched.

Living under infrastructure – Animal spends extended periods (>1hr) of time sleeping, resting, eating under human dwellings.

Following closely – Animal is actively following a person and will change direction to continue to follow. Animal will undertake this action for periods of greater than 30 seconds and follow within distances of 30 to 50 metres. Animal will stop or move away if confronted. Animal becomes disinterested after a short period of time. *Distinguish from 'stalking'.*

Dingo activity associated with human presence – Animal regularly seen (successive days) in areas during times of high human presence i.e. animal present at barge landing sites just prior to departure or around day use facilities at lunch time. Animal usually looking for food.

Damaging Property – Animals may steal unattended property such as jackets and shoes. Animal will chew containers or damage tents to investigate for food. Usually occurs in unattended camps and dwellings. *Distinguish from tent and clothing ripping*

Category D

Growling/Snarling – If confronted or approached animal will usually face a person from a short distance (<10 metres) in a dominating manner. Animal will growl and snarl as a warning not to interfere with it *'Can be associated with dominant submissive testing'.*

Dominate/submissive testing – Often described as playful behaviour. Behaviour more prominent amongst younger animals. Animal/s will approach close to people (<5 metres) and may jump around and yap and nip in an excited manner. Aggression from the animal may escalate if people respond inappropriately such as running away. *'Can include growling, snarling and stalking'.*

Stalking – Similar to following closely except individual can be at a closer distance 5 metres and will continue to follow despite efforts to deter. Will occur for a longer period of time. Efforts of dingo solely focused on person being followed with no sign of becoming disinterested. *Distinguish from 'following closely' and 'ambushing'.*

Tent Ripping – Animal will actively destroy tents and camping equipment in search of food. Usually occurs in unattended camps and animal will usually move away if discovered or confronted.

Clothing ripping - Animal is actively trying to steal property of food directly from a person. Includes snatching items from a person's hand.

Circling – A single or numerous dogs circle a person from within a distance of 20 metres but no attempt is made to stop the progress of the person or bite. The dogs are showing a definite interest in person but can be deterred especially if more than one person is present.

Dominant towards humans – Animal shows no fear of people and is not easily deterred when confronted or approached. Includes confronting people for food, snatching food from a person's hand and herding people into the sea or stopping them from walking in a particular direction. *May lead to aggression such as snarling, bailing up, nipping and biting.*

Dingo Activity Categories

Incorporate humans into pack behaviour – This can involve dogs ‘running’ distance greater than 50 m to investigate a person more closely. Other behaviour will usually follow often dependent of persons response. *‘Can be associated with dominant/submissive testing and dominance towards humans’*.

Humans regarded as competitors for resources – Animal will aggressively defend food and other pack animals when confronted.

Category E

Nipping – Includes mouthing of any description, regardless of whether penetration of the skin or bruising has occurred

Biting – Penetration of skin or bruising has occurred

Attack – Numerous bites have occurred and dingo persists despite efforts to deter animal.

Bailing up/ambushing – Similar to stalking and circling except dingo has made attempt to stop the progress of a person. Animal continues with such behaviour despite concerted effort to deter or move away. *Distinguish from ‘Stalking and circling’*.

Lunging – Jumping, can also include animal coming quickly from behind at a persons heels. Attempts to nip and bite.

Hunting tactics – Usually involves more than one animal. Animals may make a fast approach from a distance (>50 metres) to test a prey response from people. Behaviour appears to be more prominent towards children and women. Animals will circle (within 5m radius), with one or a number of individuals attempting to bite, normally from behind. Such behaviour can occur to a group of people and animals are not easily deterred. Usually associated with lunging, ambushing and bailing up. *Distinguish from ‘circling and stalking’*.

Appendix 17

Risk matrix (Source: QPWS)

| Risk Calculator | | | | | |
|-----------------|---|----------|---------|-------|--------------|
| Likelihood | Consequences How severe could the damage be? | | | | |
| | Minor | Moderate | Serious | Major | Catastrophic |
| Almost Certain | H | H | VH | E | E |
| Likely | M | H | H | VH | E |
| Possible | L | M | H | H | VH |
| Unlikely | L | L | M | H | H |
| Rare | VL | L | L | L | M |

VL-Very Low L-Low M-Medium H-High VH-Very High E-Extreme

LIKELIHOOD
Almost Certain is expected to occur in most circumstances
Likely will probably occur. <=50% chance occurring
Possible might occur at some time. Clear evidence of such events / general view they could occur
Unlikely unlikely to occur, but a history of the event in the type of work, industry or environment
Rare may occur only in exceptional circumstances but no history of such an event occurring

CONSEQUENCES
Catastrophic multiple fatalities, extensive financial loss, disruption to services or environmental damage
Major single fatality, permanent disability, significant financial loss, serious environmental damage
Serious serious bodily injury/illness, absent from work >4 days, substantial financial, environmental damage
Moderate medical treatment required, notable financial loss / environmental damage
Minor first aid treatment, no lost time, insignificant financial loss / environmental damage

CENTRAL

| ACTION REQUIRED | |
|-----------------|--|
| E | Extreme Risk Risk not acceptable. Immediate urgent action required. Stop activity immediately. Conduct detailed risk analysis |
| VH | Very High Risk Risk not acceptable. Immediate management action required to reduce risk. Stop activity immediately. Conduct detailed risk analysis |
| H | High Risk Risk not acceptable. Prompt management action required to reduce risk. Conduct detailed risk analysis |
| M | Medium Risk Risk not acceptable. Scheduled management action required to reduce risk |
| L | Low Risk Scheduled corrective actions as part of normal operations |
| VL | Very Low Risk Monitor and review as a routine practice. No direct action required. |

Appendix 18


Quarterly risk assessment results (Data source: QPWS)

Appendix 19

Action audit - FIDMS

| Strategy | Category | Section number | Action 2006 HDMS | Overall action number (used in 2009 audit) | Comments and recommendations from 2009 audit (Corbett) | Indicator (s) to assess 2006 action and 2009 audit recommendations | Evaluation of progress | Progress status | Recommendation |
|--|------------------------------------|----------------|--|--|--|---|--|---|----------------|
| Strategy 1 Comprehensive scientific research and investigation to be undertaken to ensure the principles and practices of dingo management are sound. | 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 | There are two relevant studies: (a) Population and behavioural ecology of the dingo on Fraser Island. This is a collaborative research program between the University of Queensland (UQ) (Nick Mackenzie PhD student), GPWS and the Queensland Department of Natural Resources and Mines (QDNRM). This research commenced in 2002 with field work and reporting (thesis) originally due for completion in 2006, however due partly to technical problems with DNA analysis, this study remains uncompleted in 2009. Despite the reporting to GPWS of some apparently useful preliminary results, this research urgently needs assessment initially by thesis supervisors and subsequently (as research paper(s)) by reviewers of an internationally recognised scientific journal. Only then will the interpretations of the data be of international standard and thus, if need be, defensible in a court of law. Also, as identified in the previous 2003 audit, these data are likely to be vital in estimating the current size and distribution of the island dingo population, and thus assessment of whether or not dingo numbers have been culled below a naturally sustainable level. (b) Dingo diet and prey availability on Fraser Island. This MSc study (Dafna Angeli, University of the Sunshine Coast) was completed in 2006, and despite the small number of scat samples used to estimate food types, this study used good theoretical and practical methods to assess prey abundance which should be used in future studies. It is important to continue with focussed follow-up studies (every 2-3 years) to assess trends in prey types and seasonal/weekly availability and thus to aid in predictions of 'forest' dingo abundance, movements and feeding behaviour. | * Population and behavioural ecology study completed, including peer review. Current data from the island dingo population is known (current to within 12 months). | Not yet achieved. Data from the population and behaviour ecology study (Baker) is still being analysed. An accurate method of determining dingo population size has not been identified, and the current population is not accurately known (150+ 50). Most prior dingo ecology studies remain either incomplete and/or unpublished with data yet to be analysed. To avoid duplication and unnecessary investment, there is an urgent need to synthesise the completed and available data for publication. |  | M |
| | Ecological and historical research | 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. | 2 | Based on discussions with Rangers and researchers, it is apparent that the intensive violence and dingo control in tourist areas in recent years has 'educated' dingoes so that most now live and feed in the forest. It is therefore vital to regularly assess dingo abundance, distribution and diet, and food availability. Variety and abundance in forest areas to ensure that the Fraser Island dingo population is sustainable over the long term. For these reasons, and as indicated in Action 1 above, it is also vital to (a) assess and monitor both dingo and a range of prey numbers in forest areas, and (b) assess and integrate research projects including methods to ensure that monitoring and research programs will deliver useful results. Overall, the nature and quality of the research projects initiated since the previous 2004 audit are appropriately focused and generally well executed; however, there needs to be more timely data analysis and integration of results between projects so that Management can ensure that the research and monitoring programs are integrated and focused on the needs of both visitors and native inhabitants of Fraser Island. | * Research data analysed and results integrated between projects within 12 months of project completion. * Assessment of dingo abundance, distribution and diet; and food availability in forest completed annually. | Not yet achieved. See 1.1. In relation to prey monitoring, regular fauna surveys used to be conducted annually (approximately six years ago) but have not been possible due to other requirements of GPWS staff. Interim surveys are continuing, including camera trapping. GPWS also see benefit in more comprehensive habitat assessments and are collaborating with research bodies. A comprehensive fauna survey is planned for March 2013, although additional resource will be required. |  | M |
| | Ecological and historical research | 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. | 3 | As indicated in 4.1.1 above, the long-term dingo population study commenced in 2002 with a PhD study (based on dingo tracks & DNA analysis) and a follow-up study (based on radio-tracking) commenced about 2006 by another PhD student. Although this is the correct sequence of research, the data collected over the past 6 years or so have not been rigorously scrutinised either by thesis examination or by journal reviewers. The current results are therefore 'provisional' and possibly represent an inadequate or misleading baseline for Park Managers to base current and future management decisions. It is therefore strongly recommended that these research data be critically assessed as soon as possible so that the current rate of dingo mortality by humane destruction and accident can be reconciled with a sustainable natural dingo population on Fraser Island. | * Research data peer reviewed and published (where possible) or reviewed and publicly available. | Not yet achieved See 1.1. |  | M |
| | Ecological and historical research | 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. | 4 | This study commenced in 2006 but few data were obtained prior to the recent upgrading to satellite collars. The remote methodology should provide many useful data on the locations of tagged dingoes; however, it is strongly recommended that concurrent on-ground observations of tagged dingoes be regularly undertaken to assess inter-specific and intra-specific behaviours. | * Radio tracking study feasibility known/project commenced. * On-ground observations of tagged dingoes recorded simultaneously with tracking study. | Ongoing and progressing appropriately. Tracking study commenced and data collection completed. It is recommended the results of this work be made available in a final report by June 2013, with scientific publication of the results by December 2013. Camera-tracking study commenced. This work should be evaluated by a scientific advisory committee to determine the most efficient use of the technique into the future. This is important and should be factored into GPWS budget. |  | M |



| Strategy | Category | Section number | Action 2006 HDMS | Overall action number (used in 2009 audit) | Comments and recommendations from 2009 audit (Corbett) | Indicator (s) to assess 2006 action and 2009 audit recommendations | Evaluation of progress | Progress status | Recommendation |
|----------|------------------------------------|----------------|--|--|--|---|---|---|----------------|
| | Ecological and historical research | 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. | 5 | As indicated in 4.1.1 above, an initial study of dingo diet based on scats and prey availability was completed in 2006. It is important to continue with focused follow-up studies (every 2-3 years) and to make use of the 2006 study to assess trends in prey types and seasonal/yrly availability. These data will aid predictions of forest dingo abundance and their movements and feeding behaviour. | * Delay ecology project * Completed up dietary ecology project including major prey habitats completed every 2-3 years. | Ongoing and requires progression. A variety of small-scale dietary studies have been completed, but none have been published or synthesised. While the data is available, the results have not yet been developed into a format useful for managers. This is important and should be factored into QPWS budget. |  | M |
| | Ecological and historical research | 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. | 6 | As indicated in 4.1.5, the first of these studies has been completed. | * All major habitats monitored quarterly for two years to determine seasonal prey fluctuations. | Not yet achieved. QPWS is working towards engaging experts and volunteers to assist achieving regular monitoring. |  | M |
| | Ecological and historical research | 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. | 7 | Regarding tissue samples for DNA analysis, a recent research paper (Elledge et al. 2008) that compared molecular (DNA), morphological (skull) and visual appearance methods on the same data set indicated a high level of inconsistency both between and within methods. The discrepancies are likely to be related to the time of collection of the reference samples used in both skull measurements and DNA analysis – both reference data sets are of recent origin (post-European settlement) and thus possibly contain domestic dog genes. Given this limitation of the current methodology in assessing dingo status, it is unlikely that a practical method of determining dingo purity can be resolved. There are, however, recent observations (Corbett unpublished) suggesting that (i) 'pure' dingoes are 'original-type' dingoes that persist in genetically hybrid wild populations and (ii) the key to the conservation of wild 'original-type' populations may be the maintenance of relatively undisturbed habitats with native prey. Given this dilemma in assessing dingo status, QPWS management should consider managing the Fraser Island dingo population based on dingo external appearance (phenotype) and their ecological role rather than genetic criteria (genotype). This would guide criteria for humane destruction (routinely cull all animals that do not have 'original-type' dingo colour & shape) and also provide an option to repopulate Fraser Island with mainland 'original-type' dingoes should a catastrophic event (e.g. rabies) decimate the current Fraser Island population. Until this problem of dingo definition is debated and solved, it is recommended that duplicate hair samples continue to be taken and appropriately preserved. | * Tissue samples collected and sent for DNA analysis, with duplicate copies stored. * QPWS have protocols/procedures for managing Fraser Island dingo populations based on external appearance and ecological role. * Criteria for humane destruction of all animals that do not have 'original-type' dingo colour and shape have been developed. * Protocols/procedures developed for option to repopulate Fraser Island with mainland 'original-type' dingoes. | Ongoing and progressing appropriately. QPWS do collect and store tissue samples from all deceased dingoes for DNA records, and have approached genetic groups for potential use. Incidence of culling based purely on phenotype and has not reportedly occurred at least for a decade. The recommendation should be excluded from the HDMS, given that the small proportion of hybrids in the population will be genetically swamped over time by the number of 'pure' dingoes. As recommended in 2009, duplicate hair samples should be collected and stored from all deceased and trapped dingoes. This is currently not occurring, but could be done without much additional effort. Fraser Island dingoes have been identified with a distinct genotype compared to their mainland counterparts. Repopulation with mainland dingoes would threaten this distinct genotype. Protection against a catastrophic event should be through storage of genetic material to allow captive breeding if required. |  | R |
| | Ecological and historical research | 1.8 | Skulls from dingo corpses will continue to be collected and measured to monitor hybridisation. | 8 | Action 8 should continue until Action 7 is resolved. However, this Action 8 should be rewarded as "skulls of adult dingo corpseshybridisation" because only skulls of adults can be used in the assessment analysis. | * Skull measurements of adult dingoes recorded and samples stored. | Ongoing and requires progression. Skulls are not always obtained unless for a specific study as it is relatively resource intensive and there is a lack of an ongoing coordinated program. It is recommended that QPWS collaborate with other parties to ensure necropsies are done on all deceased dingoes, and that adult skulls are retained from this process, measured and stored (i.e. with the Old Museum). |  | R |
| | Ecological and historical research | 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. | 9 | This Action has been completed. | | Completed. |  | Rem |
| | Ecological and historical research | 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. | 10 | Juveniles have been predominantly sampled to date. All opportunities to measure and assess dead adults should be taken to increase sample size and thus confidence in data comparisons with dingoes elsewhere in Australia. | * Dingo carcasses autopsied with reports on file (electronic). | Ongoing and requires progression. All deceased animals are assessed to determine cause of death, weights taken where carcasses are intact, and records now kept for all deceased individuals. QPWS arrange autopsies when cause of death cannot be determined. QPWS work with RSPCA, and have sourced local veterinarians that offer in-kind time contribution. Trained QPWS staff also conduct additional basic necropsies when time permits, and consult with veterinary staff where required. Time constraints on QPWS staff currently prevent autopsying or arranging veterinary autopsy for all deceased dingoes. It is recommended that QPWS approach suitable parties who can take responsibility for arranging collection and processing of deceased dingoes for autopsy without the requirement of QPWS time. |  | M |

| Strategy | Category | Section number | Action 2006 HDMS | Overall action number (used in 2009 audit) | Comments and recommendations from 2009 audit (Corbett) | Indicator (s) to assess 2006 action and 2009 audit recommendations | Evaluation of progress | Progress status | Recommendation |
|----------|------------------------------------|----------------|---|--|--|---|--|---|----------------|
| | Ecological and historical research | 1.1.1 | Results from dietary analysis of gull contents from outcasted animals will be analysed and correlated with scal sampling results. | 11 | This Action is regularly updated and ongoing. | * Results of gull contents and scal analysis correlated and report generated. | Ongoing and requires progression. See 1.10. Time constraints prevent QPWS staff from being able to analyse scat samples, or collate various data sets. However a current dietary study includes scat collection and analysis and should be correlated with gull content data. |  | M |
| | Dingo-human interactions | 1.1.2 | 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. | 12 | As indicated elsewhere, appropriate ongoing actions are being undertaken to address these issues. | * Records available on dingo behaviour and dingo-human interactions. | Ongoing and requires progression. Incident reports are the main record of dingo-human interactions, with full reports on Code C, D and E incidents kept on file, and key information transferred into an incident database. Additional information gathered by QPWS on human-dingo interaction observations are kept in hard copy (including Code A and B records). This level of reporting is too extensive to maintain in electronic format by QPWS staff, although it is available for QPWS reference where required. If a camera data is also kept on file to identify animal movements, QPWS are currently working on transferring this information into an electronic database. Research on dingo-human behaviour and interactions should continue as a priority to inform management, and should include spatial information to allow analysis at this scale. All QPWS data (i.e. ear tag register, incident, humane destruction) should be kept in a centralised database. Although this would take a considerable initial investment, it would greatly improve efficacy and potential for analysis. This should be a locked database with delegated staff only to enter information to ensure consistency. There should be an increased emphasis on the use of camera-trapping for monitoring dingoes all over the island as an effective and efficient method of obtaining data on population size and movement. |  | M; N |
| | Dingo-human interactions | 1.1.3 | 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. | 13 | As indicated elsewhere, appropriate ongoing actions are being undertaken to address these issues. | * Dingo abundance and behaviour data available. * Evidence of regular assessment of ranges and in interpretation of dingo descriptions and data. | Ongoing and requires progression. See 1.1 and 1.12. |  | M |
| | Dingo-human interactions | 1.1.4 | A program of regular monitoring will include recording and observing individual animals, numbers of encounters, at all visitor nodes and the frequency and duration of dingo visits to these sites, on accurate and representative range of dingo incidents, and the size and status of the dingo population for collating in a central QPWS database. | 14 | These actions are ongoing and a database of individual dingo profiles has been established. | * Data recorded and collated in central QPWS database, photos stored on file. | Ongoing and progressing appropriately. See 1.12. More work can be done in appropriate analysis of the data, and subsequent dissemination of the information (See 1.1). |  | M |
| | Dingo-human interactions | 1.1.5 | Island visitors will be surveyed about dingo incidents and responses correlated with incident reports by Rangers. | 15 | This Action is appropriate and ongoing. The role of Rangers in informing visitors of dingo issues and the penalties for non-compliance has been very successful and has greatly contributed to the decline in serious dingo incidents in recent years. | * Island visitors surveyed and compared with Ranger incident reports. | Ongoing and progressing appropriately. All incident reports are taken by QPWS (i.e. visitors do not submit their own written report) which allows thorough interrogation of facts and QPWS staff interpretation. It is critical that QPWS staff are sufficiently trained in interpretation of dingo behaviour. QPWS also regularly collects information through camper briefings and talking with visitors to seek information that may otherwise not be reported. |  | M; N |

| Strategy | Category | Section number | Action 2006 FDMS | Overall action number (used in 2009 audit) | Comments and recommendations from 2009 audit (Corbett) | Indicator (s) to assess 2006 action and 2009 audit recommendations | Evaluation of progress | Progress status | Recommendation |
|----------|--------------------------|----------------|--|--|--|---|---|---|----------------|
| | Dingo-human interactions | 1.16 | The possible correlation between the dingo breeding season and greater levels of aggression towards humans will need to be investigated. If the correlation is confirmed, then the following actions should be considered 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. | 16 | Preliminary assessment of current data sets suggests that dingo aggression towards humans may occur at any time of year but with a higher probability of occurrence in April and September when most dingoes male and most pups are weaned. However, the relationship may be complicated because peak visitor numbers usually occur during the Easter holidays (March/April). It is recommended (i) that the current relevant data sets be rigorously analysed and (ii) dingo awareness programs be heightened over the Easter period by Camp Rangers, particularly to visitors in isolated beach camping sites and to visitors undertaking long island treks. | * Results from investigation into correlation between dingo breeding season and increased aggression towards humans. A qualitative and appropriate action incorporated into management. * Current relevant data sets rigorously analysed * Dingo awareness programs heightened over the Easter period, particularly at isolated beach camping sites and visitors undertaking treks. | Ongoing and requires progression. The relevant datasets remain unanalysed. Preliminary analysis continues to reaffirm the importance of the March-April period for increased numbers of incidents. Accurate data on visitor numbers is critical to evaluating seasonal effects on incidents. If there is uncertainty in the correlation through analysis of current data sets, a new study would be necessary and should be over a long period of time. Research into key locations should be included in such research to determine the use of seasonal closure of important areas (i.e. den sites) as a conservation measure and to prevent incidents. Until the results of such research are available, resources should be focused to allow increased vigilance in periods with historically high number of incidents. |  | M; N |
| | Dingo-human interactions | 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. | 17 | This action is appropriate and ongoing. | * Dingo hot-spots identified. | Ongoing and progressing appropriately. This information is collected regularly by QPWS staff, and is used to inform management decisions (i.e. increased education, campground closures). Quarterly risk assessments are also undertaken for all sites on the island. |  | M |
| | Dingo-human interactions | 1.18 | Workplace health and safety reporting will be continued as a high priority. | 18 | This action is appropriate and ongoing. | * Workplace health and safety reports continuously produced. | Ongoing and progressing appropriately. Workplace Health and Safety recording and reporting is done in accordance with existing QPWS protocols and procedures. This includes all risks, including those posed by wildlife (i.e. dingoes). It is recommended that this be removed as a FDMS-specific action. |  | Rem |
| | Training | 1.19 | QPWS staff involved in dingo management 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. | 19 | The training of relevant QPWS staff is appropriate and ongoing, and it is noted that it takes about 6 months to train new Rangers in dingo management issues. The current practice of regular updates of dingo issues to resort staff and island residents is supported. | * QPWS staff correctly fill in incident and monitoring reports. * Island residents and resort staff receive ongoing training when necessary. * Regular updates of dingo issues regularly provided to resort staff and island residents. | Ongoing and progressing appropriately. QPWS staff are extensively trained in all aspects of dingo identification, incident reporting and related matters. This is completed through online training, mentorship by senior staff, tool box talks, team meetings and standard training programs (i.e. capture and handling). Incident and monitoring reports randomly selected from the comprehensive supply provided by QPWS were examined and found to be correctly completed. Staff are not permitted to work without direct supervision until competency is signed off by managers. QPWS also engages external professionals to assist staff training when knowledge gaps are identified. QPWS regularly liaises with residents, resort staff and tour operators to ensure they are informed of appropriate behaviour and resort procedures and most current information. This includes through dingobriefs, which are increased around school holiday periods, community engagement sessions. The additional resource provision to allow QPWS involvement in research projects would be beneficial to upskill staff, improve morale and greatly add value to implementation of the FDMS. |  | R |
| | Training | 1.20 | Training programs will be regularly evaluated and updated to ensure new information is incorporated and techniques remain valid and consistent. | 20 | This action is appropriate and ongoing. | * Training program has most up to date information available relating to dingo issues. | Ongoing and progressing appropriately. Training programs are updated internally as required where new information is available and improvements possible. Independent review of methods used in training programs is also initiated through FDMS audits and reviews. Periodic review by an advisory committee would be beneficial. See also 1.19. |  | R |
| | Methodology | 1.21 | Marking techniques (such as tagging or using collar guns to apply hot-boxes and dye) animals will continue to be investigated and tested. The current tri-colour ear tagging system will continue until a better system is identified. | 21 | The current methods used to capture dingoes and apply ear tags are appropriate, it is apparent that Rangers can now reliably identify all dingo ear tags in the field, and it is recommended that the current tri-colour coding of dingo ear tags continue as the standard method. | * Tri-colour coded ear tags continue to be used to identify dingoes. * Trial of other marking techniques completed/underway. | Ongoing and progressing appropriately. QPWS has trialled various alternative identifying systems, including varying ear tags and colour-marking. However as discussed in Appendix 3, these have not been effective. The current tags should continue to be used unless an appropriate alternative is identified. |  | R |

| Strategy | Category | Section number | Action 2006 FIDMS | Comments and recommendations from 2009 audit (Corbett) | Indicator (s) to assess 2006 action and 2009 audit recommendations | Evaluation of progress | Progress status | Recommendation |
|--|-----------------------------------|----------------|--|--|--|---|-----------------|----------------|
| | Methodology | 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 monitor changes in diet composition. Projects including regional and spatial variation in the diet of island dingoes and the effects of dingoes on prey species. | Relevant QPWS staff have been trained in the identification of prey remains in dingo scats, and additional scat analysis has been undertaken by students. • Regular training of staff from forest sites be continued to assess personal and regional scat collection and processing, in conjunction with assessment of numbers to aid in assessing the sustainability of the island dingo population, and to achieve these aims • The identification of prey in scat samples should be conducted on a regular (quarterly) basis. | • Relevant QPWS staff are trained in the identification of prey remains in dingo scats. • Regular training of staff from forest sites be continued to assess personal and regional scat collection and processing, in conjunction with assessment of numbers to aid in assessing the sustainability of the island dingo population, and to achieve these aims • Identification of prey in scat samples conducted on a quarterly basis. | Ongoing and progressing appropriately. QPWS are currently assisting collection of scats from an extensive dietary study. There is also a regular volunteer program to assist with scat collection. It is not possible with current resources to suitably train and assign staff to scat analysis. On cessation of the current study, analysis should be continued through research projects, or funding be made available for such analysis. Collection should be incidentally by QPWS staff, and through targeted surveys by volunteers or as components of relevant research. | | M |
| | Funding and co-operation | 1.23 | Funding options for core research projects such as population biology/dynamics and dietary ecology will be investigated. | This Action is appropriate and ongoing, however, as indicated elsewhere, it is vital to regularly assess and integrate research results so that the core research is focussed and timely. | • Information available on priority research projects and funding options. • Research results are regularly assessed and integrated and research is focused and timely (within 12 months of research completion). | Ongoing and requires progression. QPWS are currently exploring collaborative and funding options with various research bodies. However research needs to be completed, reported and widely disseminated in a more timely fashion. See 1.1. | | M |
| | Funding and co-operation | 1.24 | Research proposals and funding arrangements will be negotiated with interested universities and research organisations. | This Action is appropriate and ongoing. Relevant recommendations identified in the previous Audit are again recommended in this Audit, viz: QPWS should formally write into Agreements with students and/or their Universities that: • All research projects must submit key results for publication in a peer-reviewed scientific journal within 12 months of completing university requirements; and • All such publications and other related external reports and articles appropriately acknowledge QPWS. | • QPWS write into formal agreements with students and Universities, that results are submitted for publication within 12 months and appropriately acknowledge QPWS. | Ongoing and requires progression. Various agreements are initiated between QPWS and research bodies, however there are not currently translating into completed technical reports or scientific publications. For QPWS funded research, proven track record should be considered. | | M |
| | Funding and co-operation | 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. | As indicated in 4.1.3 above, the major research project on dingo population dynamics is well behind reporting and publication schedule. To help obtain appropriate and timely research information, it is recommended that: Action 25 is reworded as: "All research projects must submit key results for publication in a peer-reviewed scientific journal within 12 months of completing QPWS and University agreed formal requirements. All such publications and other related external reports and articles must appropriately acknowledge QPWS and relevant staff." | • Action 25 has been reworded. | Ongoing and requires progression. See 1.1. | | R |
| Strategy 2 Awareness programs will continue to encourage appropriate behaviour towards dingoes by island visitors, residents and staff. | 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. | This Action is appropriate and ongoing. Updated and new methods of informing island visitors about dingoes is now available by website, by telephone hotline and an email address, and these actions by QPWS are appropriate and commendable. The face-to-face contact between Park Rangers and on-site visitors is proving to be a very effective method of enforcing dingo awareness including the penalties for non-compliance with prescribed visitor behaviour. There is mounting evidence that camps with children in 'isolated' and 'out-of-sight' beach locations are likely to be under higher risk of food theft and attack by dingoes, relative to communal and/or fenced camp sites. It is recommended that (i) QPWS continue to regularly assess and update dingo awareness information and make it available to visitors both prior to and during visits to the island, (ii) the current focus on the number and roles of Park Rangers be continued, and (iii) QPWS devise a method whereby camps with children in 'isolated' and 'out-of-sight' beach locations are personally provided with timely dingo awareness advice. | • The program's effectiveness reassessed through regular visitor questionnaires run every few months, with appropriate analysis and recommendations. • Communication performance objectives developed using SMART principles, including those to allow objective monitoring and evaluation. • Dingo awareness information is assessed and updated regularly. | Ongoing and requires progression. Dingo awareness information is assessed and updated regularly; other measures not yet achieved. Frequent visitor surveys not practical - modify recommendation to conducting these every 3 years. Communication performance objectives should still be developed. | | M |
| | Strategic planning and evaluation | 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. | This Action is appropriate and ongoing. Dingo awareness and other information signs are regularly assessed by QPWS staff and from visitor feedback. The various signs observed by Corbett at all sites in March 2009 were appropriately located, informative, non-intrusive and easily read. | • Signs have most up to date information available. • Signs are appropriately located, informative, non-intrusive and easily read | Ongoing and progressing appropriately. On site observations were not possible for this review, but electronic copies of signs and detailed audit spreadsheet indicate that many signs have been updated and most are appropriately located, informative, non-intrusive and easily read. | | M |
| | Strategic planning and evaluation | 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. | This Action is appropriate and ongoing. | • Research project on psychological aspects of human attitudes to island dingoes scheduled/completed. | Not yet achieved. | | M |

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| | Strategic planning and evaluation | 2.4 | Recent social sciences research and internet discussions on human behaviour will continue to be investigated for possible application to dingo awareness programs. | 29 | This Action is appropriate and ongoing. | * Social science research and internet discussions investigated and application to dingo awareness program reported/incorporated. | Ongoing and requires progression Education review reports provided by consultants have investigated these opportunities in a number of ways. QPWS have conducted preliminary investigation of opportunities for providing input into social media, and are already conducting ongoing monitoring of these networks. |  | M |
| | Strategic planning and evaluation | 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. | 30 | This Action is appropriate and ongoing. This Action includes the Camp Ranger daily visits to all camping grounds, and although labour intensive, this Action is a major reason for the reduction in dingo-human interactions recorded in recent years. | * Messages about responsible interaction with dingoes, including that feeding is illegal and incurs fines, are included in wide range of educational media.* Dingo awareness information is available to visitors both prior and during visits to the island. | Ongoing and requires progression. This requires ongoing efforts to update education messages and optimise distribution. |  | R |
| | Strategic planning and evaluation | 2.6 | All visitors to the island, including those on day-tours, will continue to be provided with the dingo information brochure. | 31 | This Action is appropriate and ongoing. | * Every visitor receives dingo information brochure. | Not yet achieved. While many visitors receive dingo information brochures, some groups do not (e.g. many commercial tour clients, people who book online). Ideally all visitors would receive the large Dingoes of Fraser Island brochure, but if resources are prohibitive, the small dingo safety flyer (which should be regularly updated) should be sufficient. |  | R |
| | Strategic planning and evaluation | 2.7 | Contractual arrangements will be established with all private permit issue centres to ensure dingo safety information is provided to all visitors. | 32 | This Action is appropriate and ongoing. | * All private permit issue centres under contract, which includes requirement to provide dingo safety information to all visitors. | Ongoing and progressing appropriately. All private permit issue centres have contracts which include provision of permit packs (including dingo safety information) to visitors, and QPWS staff report that this is occurring as per contract. |  | R |
| | Strategic planning and evaluation | 2.8 | Meetings and newsletters will continue to inform island residents and resort staff about dingo-human interactions. | 33 | This Action is appropriate and ongoing. QPWS provides regularly updated information packs and conducts regular meetings with Resort management and island residents. | * Island residents and resort staff receive regularly updated information and meetings regularly conducted. | Ongoing and progressing appropriately. Sandpaper distributed to all residents and resorts on island (as well as other groups including CIOs). Community engagement sessions at community events formally and informally regularly. |  | R |
| | Strategic planning and evaluation | 2.9 | Training and information will be provided for staff of tour operator companies, backpacker hotels, 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. | 34 | This Action is appropriate and ongoing. Relevant information is presented by the various tour and accommodation operators to visitors prior to visiting the island, during transport to the island and while on the island. | * All staff of tour operator companies, backpacker hotels, 4WD hire companies and the island's accommodation businesses have received training and information from QPWS. | Ongoing and requires progression. Most tourism/accommodation providers have received training or information through e.g. formal information sessions, community engagement sessions, regional dingo education campaigns. However some operators do not present much dingo safety information to their guests, and this is difficult to enforce. Recommend measures to increase provision of information to tour operators and to ensure they distribute information to guests. |  | R |
| | Strategic planning and evaluation | 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. | 35 | This Action is appropriate and ongoing. | * All visitors to the island receive information and advice about dingo safety issues from all transport service providers when entering the island. | Not yet achieved. Barge pilots, bus tour drivers asked to make dingo announcement, reminded during campaigns. However, this information is minimal and there is evidence that it does not always occur or is not heard by many guests. |  | R |
| | 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. | 36 | This Action is appropriate and ongoing. | * Residents informed of responsibilities and consequences of dingo-related behaviour. | Ongoing and progressing appropriately. Conducted through targeted community engagement meetings, presentations, blogs and social media. Dingo education campaign materials – fridge magnets, Also through Sand paper. |  | R |
| | Content of educational messages | 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. | 37 | This Action is appropriate and ongoing. | * Messages about risks dingoes pose and the need for appropriate actions by visitors incorporated into education program. | Ongoing and progressing appropriately. These are dealt with through the dingoes roaming series and "when on Fraser Island..." series. |  | R |
| | Content of educational messages | 2.13 | Visitors, residents and staff will be urged to regard dingoes as wild animals seen infrequently, rather than semi-domesticated camp dogs. | 38 | This Action is appropriate and ongoing. | * Messages in educational materials consistently represent dingoes as wild animals... | Ongoing and progressing appropriately. These messages are now consistently presented in educational material including signs, brochures, newsletters, media releases (Minister's holiday messages), brownies coatwatch announcements etc. |  | R |






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| | Content of educational messages | 2.14 | Techniques and media will be investigated to ensure the education message becomes even more effective. | 39 | This Action is appropriate and ongoing. Updates in dingo awareness messages are largely based on positive feedback from island visitors, business operators and residents. | * Research undertaken on effectiveness of techniques and media and how this can be improved. | Ongoing and progressing appropriately. Literature reviews conducted as part of consultancy reviews have provided some information on this. Senior educational adviser has done a further exploration of social marketing techniques. However resources have not been available for more to be done internally and no research collaborations have yet been undertaken in this area. This topic should be included in list of desired research by external bodies, and given medium priority. |  | M |
| | 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 littering. | 40 | This Action is appropriate and ongoing. | * Face to face contact by rangers in delivering education to campers maintained or increased in relation to number of visitors, with focus on priority audiences including beach camping and littering.* Educational briefings by rangers continue at current or increased level (in relation to visitor numbers) * Campers with children in isolated beach locations are personally provided with dingo awareness advice. | Ongoing and requires progression. Ongoing face to face education by rangers is provided to campers, and such efforts are increased during peak visitor times, and planned to focus on priority audiences. However evidence from QPWS was equivocal about whether such activities have increased, decreased or stayed constant - it seems likely however that on a per visitor basis, the level of public contact has decreased. This is seen as a high priority by QPWS but is heavily restricted by staff resources, such that at peak visitor times only about half of campers receive ranger contact. While camper with children in isolated beach locations are seen as a high priority concern, resources often do not allow these groups to personally provided with dingo awareness advice. |  | R |
| | Personal contact | 2.16 | Rangers on patrol will continue to devote more time and effort to interpretation of signs, guides and related issues, and will deliver appropriate behaviour towards dingoes while using the opportunity to explain the consequences of that behaviour to the public. | 41 | This Action is appropriate and ongoing. | * Education messages delivered by rangers routinely include encouraging appropriate behaviour in relation to dingoes, including existence of fines. This is evidenced by briefings guidelines provided to rangers, and our on site observations of several briefings, feedback from QPWS staff. However, there is some evidence of inconsistencies in messages and it is not clear to what extent information is provided effectively, or explanations are given. Given the importance of ranger briefings, an objective evaluation of these is recommended for the next review. | Ongoing and progressing appropriately. Briefings provided by rangers routinely include discouraging inappropriate behaviour in relation to dingoes, including existence of fines. This is evidenced by briefings guidelines provided to rangers, and our on site observations of several briefings, feedback from QPWS staff. However, there is some evidence of inconsistencies in messages and it is not clear to what extent information is provided effectively, or explanations are given. Given the importance of ranger briefings, an objective evaluation of these is recommended for the next review. |  | R; N |
| | Personal contact | 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. | 42 | This Action is appropriate and ongoing. For reasons indicated in Section 3.4 above, this Action is particularly applicable during the Easter period. | * Ranger briefings increased at sites where dingo incidents have occurred recently.* Dingo safe camping competitions continued and assessed for improvements. | Ongoing and progressing appropriately. Ranger briefings are reported to be increased in areas considered to be of high risk in relation to recent dingo incidents, although no quantitative data are available to objectively evaluate this. Future record keeping regarding ranger briefings should include location, frequency and comments on any reasons for increased briefings. Dingo safe camping competitions have occurred but it is not clear how recently or how frequently, these can be excluded from HDMS actions, as they are only of many means to deliver dingo education, which should be internally reviewed by QPWS on an ongoing basis. |  | M |
| | Personal contact | 2.18 | Rangers will leave notes on unoccupied tents recommending ways of dingo-proofing camps. | 43 | This Action is appropriate and ongoing. As indicated in 42.1 above, this action is especially important for campers with children in 'isolated' and 'out-of-sight' beach locations. | * Campers receive dingo reminders whenever non-compliance observed by rangers. | Ongoing and progressing appropriately. However there is no information available on how often this is done, and it seems likely that this does not occur for some instances of non-compliance. More comprehensive recording of enforcement activities, using simple indicators and facilitated through a simple user-friendly proforma (ideally using a small portable computer) should be adopted to enable monitoring of this and other public contact activities and infringements. |  | R; N |
| | Personal contact | 2.19 | The effectiveness of dingo reminders at tents at selected campgrounds will be tested and monitored. | 44 | This action is appropriate for most camp sites. However, as highlighted in Action 43 above, Rangers should ensure direct contact is made with occupants of 'isolated' and 'out-of-sight' beach sites. | * Comparisons made between compliance when dingo reminders issued vs not issued. | Not yet achieved for comparisons of compliance. However this may require skills and resources outside the scope of rangers, so should be deleted as an HDMS action but included in the list of desired topics for collaborative research, along with the effectiveness of other types of education and enforcement actions, as a medium priority. Campers in isolated campsites sometimes receive direct contact from rangers, but this is limited by resources. |  | Rem; N |
| | 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. | 45 | This Action is appropriate and ongoing. | * Visitor surveys undertaken to measure level of visitor awareness of danger of dingoes and appropriate precautions when confronted. | Ongoing and requires progression. Visitor surveys and anecdotal reports from rangers provide evidence that there is a fairly high level of awareness of the danger of dingoes and what to do when confronted, but further improvements are highly desirable as this is so important to human safety. Visitor surveys need to be improved to provide more useful indicators of these issues. |  | R; N |






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| | Public awareness and surveys | 221 | 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. | 46 | The reporting of dingo incidents by visitors and operators should continue because these data probably best reflect the frequency of dingo incidents. However, it is apparent that there is a high level of inconsistency in visitor/operator assessment of dingo incident types and severity as compared to assessment by trained and experienced Rangers. It is recommended that Rangers continue to interpret the initial visitor/operator reports and, where appropriate, conduct follow-up interviews to clarify the incident type and obtain further details. | * Dingo incident report forms widely distributed, or equivalent face-to-face contact to enable ranger completion * Rangers conduct follow-up interviews of reports where required. | Recommended for exclusion. Dingo incident forms are not distributed, but rather rangers fill them in by interviewing visitors. This ensures correct information is recorded, and only reports by rangers should be continued. QPWS report that rangers conduct follow-up interviews of all incident reports seen as being of concern as a matter of high priority. | | Rem |
| | Public awareness and surveys | 222 | Fraser Island residents and resort staff will be surveyed about their knowledge of and attitudes to dingoes including feeding, attacks, management, regulation and penalties. | 47 | This Action is appropriate and ongoing | * Survey of residents and resort staff undertaken and report available. | Ongoing and requires progression. Several resort staff were interviewed as part of the 2012 visitor survey. Available resources have precluded surveys or interviews with residents for the 2012 visitor survey or the current review. The present review obtained input from residents and resort staff through the online survey and stakeholder workshop. Surveys and/or interviews with residents and resort staff should be included in the next review of the HDMS, and sufficient resources allocated to allow for this. | | R, N |
| | Public awareness and surveys | 223 | 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. | 48 | This Action is appropriate and ongoing. | * QPWS review options to increase off park extension, education and awareness to residents (townships) and businesses conducted. * Appropriate actions implemented. | Ongoing and requires progression. Actions to increase off park extension, education and awareness to residents and businesses have been conducted. However, this appears to have occurred on an informal basis without any written review or formal consideration. Staff should undertake such a review, considering all available sources of information, and plan a strategic approach. | | M |
| | Public awareness and surveys | 224 | QPWS will consider a Dingo safety/ awareness week to be held during peak visitor periods. | 49 | This Action is appropriate. | * Feasibility of Dingo safety awareness week for peak periods assessed, and commenced if appropriate. | Ongoing and progressing appropriately. Seasonal dingo education campaigns have been conducted during peak periods. | | R |
| 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. | Co-operation with other agencies | 3.1 | Negotiations will be continued with the Manlyborough and Hevey Bay City Councils to establish co-operative management and enforcement arrangements across all tenures. | 50 | It was noted in the previous 2003 Audit that both City Councils declined to become involved in co-operative management and enforcement arrangements across all tenures. Since then, the SCO advised that ongoing discussion between the Councils and QPWS had improved relationships and negotiations were continuing to resolve waste management and other dingo-related issues in the villages. Also since the previous Audit, QPWS has addressed the most significant dingo-human issues in the townships by fencing Kingsfisher Bay Resort & Village (KBRV) and the Eurolog and Happy Valley townships. The significant decline in dingo incidents, especially serious D & E incidents at KBRV (QPWS unpublished data) clearly justifies this action. It is recommended that QPWS continue negotiations with City Councils and also consider fencing other public sites to address significant dingo problems. | * QPWS continues to communicate with city councils and co-operative management and enforcement occurring. * QPWS continue discussions with both councils and other public sites with significant dingo problems are fenced. | Ongoing and progressing appropriately. QPWS regularly consults with councils to encourage a cooperative approach to management and enforcement, however it was noted that council contribution could be increased. Further collaboration could be encouraged through council representation in a stakeholder forum. | | M |
| | Co-operation with other agencies | 3.2 | Local governments will be encouraged to fund the provision of dingo-proof garbage bins for all ratepayers. | 51 | As indicated in Action 30 above, continuing negotiations between Councils and QPWS are aimed at minimising dingo access to human food in the villages. In particular, unfenced town dumps not only attract dingoes to feed there but some four operators are likely to consider such dumps as a reliable site for their clients to view dingoes, and both activities create opportunities for significant negative dingo-human interactions. It is recommended that all public dumps are fenced. | * Rate payers have access to dingo-proof garbage bins. * All public waste dumps are fenced and dingoes are denied access to waste. | Completed. QPWS liaised with council to ensure that rubbish transfer stations are fenced where a township is not fenced in its entirety, although reportedly this was funded entirely by QPWS. See 3.1. | | Rem |
| | 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. | 52 | These issues are similar to issues in Action 30 above and can similarly be resolved by fencing public areas. | * Problem public areas are fenced. * Protocols and procedures relevant to dingo management being followed and enforced by resort staff. | Ongoing and progressing appropriately. Most resort areas are fenced now, and planning for remaining resort fencing is underway with management. | | M |
| | Co-operation with businesses | 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. | 53 | This Action is appropriate and ongoing. | * Disciplinary actions recorded and details forwarded to QPWS. | Ongoing and progressing appropriately. Disciplinary actions imposed by the courts or through issue of penalty infringement notices have been recorded by QPWS. | | R |




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| | Legislation and enforcement | 3.5 | QPMWS will pursue changes to address legislative anomalies on land tenures not covered by the protected area estate (e.g. pastoral lease, commercial, and surrounding areas) and enhance enforcement capability. Possible changes to local government by laws and authorised officers will be investigated to ensure consistency across all tenures. | 54 | The SCO advised that changes to legislation have not been pursued by QPMWS. Instead, the policy of fencing public areas has significantly reduced dingohuman problems. | QPMWS has pursued legislation anomalies on land tenures. | Ongoing and requires progression. QPMWS has pursued legislation anomalies, and as discussed in the report, while they are not yet able to enforce across all land tenures, there are still anomalies across legislation that need to be addressed. | | M |
| | Legislation and enforcement | 3.6 | Greater effort will be directed towards dingorelated law enforcement and regulatory activities. | 55 | This Action is appropriate and ongoing. | * Evidence of greater effort towards dingorelated law enforcement and regulatory activities. | Not yet achieved. | | R |
| | Legislation and enforcement | 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. | 56 | This Action is appropriate and ongoing. | * Residents, visitors and staff are fined or prosecuted for feeding dingoes. | Ongoing and progressing appropriately. Deliberate feeding is reported by QPMWS staff now to be extremely rare, or if it occurs, it being done in such a way that enforcement is very difficult. There have continued to be several cases of a small number of individual residents or workers feeding dingoes, although it is not clear whether penalties have been issued and other means have been the first line of attack. As even a small amount of deliberate feeding may have a large impact, it is a high priority to continue efforts to discourage this, including through targeting monitoring and enforcement where necessary. | | R |
| | Legislation and enforcement | 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. | 57 | This Action is appropriate and ongoing. | * Incidents of non-compliance in situations of confrontation with dingoes recorded and investigated where required. | Not yet achieved. | | M |
| | 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. | 58 | Fences, at about 15 sites to date, have been very successful in minimising dingohuman interactions, particularly at camp grounds and day use areas. This Action is appropriate and ongoing. | * Appropriate fences constituted at high risk public areas. | Ongoing and progressing appropriately. Fencing is continuing at high risk visitor nodes, with K'Gall scheduled and Cathedral Beach in planning. A long-term aim should be to have all commercial use sites fenced. | | M |
| | Facilities and structures | 3.10 | All picnic areas and camping grounds will be regularly audited to determine which sites require improvements to toilet, wash-up and food use facilities and provision of rubbish bin lighting. | 59 | This Action is appropriate and ongoing. | * Audit of picnic areas/camp grounds at least annually. | Ongoing and progressing appropriately. General rangers regularly audit fences and fence grids are checked monthly. Fencing campaign has largely reduced the need for other facilities to reduce dingohuman interaction, but where these are required they are managed by Strategic Asset Management Systems. | | M |
| | Facilities and structures | 3.11 | All new developments for day use and camping areas will ensure appropriate facilities are in place to address dingo management issues. | 60 | This Action is appropriate and ongoing. | * New developments include appropriate facilities. | Ongoing and progressing appropriately. No new developments are planned at this stage, however design and planning will include provision of suitable facilities. | | R |
| | Facilities and structures | 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. | 61 | This Action is appropriate and ongoing. | * Food and gear lockers available. | Completed. | | Rem |
| | Facilities and structures | 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. | 62 | The commercial companies were reluctant to provide dingo-proof crates. QPMWS resolved the issue by providing food lockers at designated camping areas and advising visitors to store food in vehicles at other sites. This Action is appropriate and ongoing. | * Dingo proof food crate provided by backpacker hostels and four-wheel drive companies to visitors. | Ongoing and requires progression. As per 2009 audit, change to commercial operators must enforce appropriate behaviour (including correct food storage). | | M |

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| | Restiction of food availability | 3.14 | The application of restrictions on fish cleaning at selected high-use sites will be continued. | This Action is appropriate and ongoing. | <ul style="list-style-type: none"> * Minimal incidents of fish cleaning in restricted areas. * Restrictions are enforced and infringements recorded. | Ongoing and progressing appropriately. There are minimal incidents of fish cleaning in restricted areas, and this is enforced with infringements where required. | | M |
| | Restiction of food availability | 3.15 | The provision of specially designed fish cleaning facilities at some locations will be investigated for feasibility. | The provision of fish cleaning facilities has reduced dingo access to food, however, a solution to totally exclude dingo access to fish food remains unresolved. It is recommended that QPWS continue to investigate methods to stop the provision of fish offal food to dingoes. | <ul style="list-style-type: none"> * Fish cleaning facilities available. * Measures to totally exclude dingo access to fish offal food investigated and incorporated where appropriate. | Ongoing and requires progression. Fish cleaning facilities and designated cleaning areas are located in low-risk areas. It is unlikely that dingoes can be completely excluded from fish offal food, and given that it is a natural food source, it is considered that probing direct feeding or fish cleaning in high use areas is sufficient. Temporary fencing is provided during high use times (i.e. fishing compellions) and fish cleaning, home storage and processing (i.e. mincing) is restricted to these areas. This should be continued as required. | | M |
| | Restiction of food availability | 3.16 | The feasibility of providing fish offal mincing stations during Tallow season will be investigated. | The provision of fish offal mincing stations has reduced dingo access to food, however, a solution to totally exclude dingo access to fish food remains unresolved. It is recommended that QPWS continue to investigate methods to stop the provision of fish offal food to dingoes. | <ul style="list-style-type: none"> * Fish offal mincing stations available and designed to limit dingo access. * Measures to totally exclude dingo access to fish food investigated and incorporated where appropriate. | Ongoing and progressing appropriately. See 64 above. | | M |
| | Restiction of food availability | 3.17 | The consumption or display of food at selected day use areas, e.g. high-use lake-side beaches, will be prohibited. | The aim of this Action is to remove food as the primary enticement for dingoes to visit selected day use sites, and thus to minimise associated adverse dingo-human interactions. This Action is appropriate and ongoing. | <ul style="list-style-type: none"> * Minimal incidents of food being consumed or displayed at restricted sites. * Restrictions enforced and infringements recorded. | Ongoing and progressing appropriately. Consumption and display of food is prohibited on lake shores but QPWS note that it is difficult to enforce due to the remoteness of the sites. Enforcement by Commercial Tour Operators is a condition of their permits, and breaches are recorded. Several permit breaches results in permits being cancelled/not renewed. | | R |
| | Restiction of food availability | 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. | As previously indicated (Action 3.1), some dumps are fenced and effectively exclude dingoes. It is recommended that all village waste transfer stations are fenced. | <ul style="list-style-type: none"> * Bins no longer located on beaches. * All dumps and waste transfer stations fenced to exclude dingoes. | Completed. All waste transfer stations and bins in unfenced areas are now in compounds. | | Rem |
| | 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. | This Action is appropriate and ongoing. | <ul style="list-style-type: none"> * High risk campgrounds closed permanently or temporarily as risk assessments determine. | Ongoing and requires progression. Current processes means that campground closure is difficult to implement. It is recommended that this is more readily included as a management strategy, and that necessary approvals be delegated to the senior NRM staff on Fraser Island to ensure timely implementation as required. Rangers are confident that at most locations they can strategically use temporary campground closure to eliminate high risk rather than moving risk to another location. Spatial analysis of incidents against management actions would help confirm its efficacy. Continued research to identify key dingo sites (i.e. den sites) or attractive/high-risk areas (i.e. barge landing points) will assist decision making on potential need for permanent or regular seasonal closures. | | R |
| | Camping changes and restrictions | 3.20 | Additional restrictions on camping at particular areas known to attract dingoes, e.g. barge landing sites and water points, will be continued. | This Action is appropriate and ongoing. | <ul style="list-style-type: none"> * Visitors prohibited from camping at restricted sites. * Restrictions enforced and infringements recorded. | Ongoing and requires progression. See 68 above. | | R |
| | 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. | This Action is appropriate and ongoing. | <ul style="list-style-type: none"> * Relevant people consulted and report generated on topic. | Ongoing and requires progression. A review of visitor numbers is due in 2013 (DERM 2008) and should include additional detail on dingo-specific aspects, including consultation with relevant stakeholders. | | R |





| Strategy | Category | Section number | Action 2006 HDMS | Overall action number used in 2009 audit | Comments and recommendations from 2009 audit (Corbett) | Indicator (s) to assess 2006 action and 2009 audit recommendations | Evaluation of progress | Progress status | Recommendation |
|---|----------|----------------|--|--|---|--|---|-----------------|----------------|
| Strategy 4 Programs will continue to be implemented to modify dingo behaviour and habits, which threaten human safety and wellbeing. | Hazing | 4.1 | At every opportunity, Rangers will score dingoes by using simple and appropriate techniques such as non-lethal projectile weapons, spray bottles containing offensive or irritating contents, 'Shur-roo', ultrasonic devices and stock whips to discourage the animals from entering camping, picnic and other high-use areas. | 71 | Several devices have been trialled including point guns, ultrasonic devices, spray bottles, rat shot and slingshots. The latter two devices are generally accepted by Rangers as the most effective; however, further innovation is required to minimise dingoes recognising and fleeing from the operators and/or the hazing device. It is recommended that Rangers seek innovative methods to improve the success rate of rat shot guns and slingshots. | *Rangers score dingoes using approved techniques. *Innovative hazing devices and methods continue to prevent dingoes accessing, camping, picnic and other high-use areas. | Recommended for exclusion. | | Rem |
| | Hazing | 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. | 72 | This Action is appropriate and ongoing. | * Island visitors, residents and resort staff discourage dingoes from high-use areas, record data and provide to QPWS. | Recommended for exclusion. See 4.1 above. | | Rem |
| | Hazing | 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. | 73 | Despite the apparent lack of cooperation in dingo management by some residents and resort staff (e.g. Actions 51 & 62), it is recommended that QPWS continue to seek support from residents and resort staff because hazing is more effective if undertaken at the time of dingo indiscretion. | * Investigation into feasibility for certain residents and resort staff to be trained with hazing devices and techniques undertaken. * Trained residents and resort staff undertake hazing activities. *QPWS continue to seek support from residents and resort staff. | Recommended for exclusion. See 4.1 above. | | Rem |
| | Hazing | 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. | 74 | Ranger experience indicates that slingshots and rat shot guns are the most effective hazing methods, despite efficiency loss due to dingoes recognising operators and/or the devices. As indicated in Action 71 above, it is recommended that Rangers use rat shot guns and slingshots as the main deterrent methods. | *Rangers regularly evaluate alternative (approved) methods for hazing. *Hazing methods regularly rotated. *Investigation into minimising operator/device recognition to improve efficiency of hazing. | Recommended for exclusion. See 4.1 above. | | Rem |
| | Hazing | 4.5 | New advances in ultra sonic deterrent or alternative technology will be monitored for possible application in dingo management programs. | 75 | Several devices have been trialled, including 'overse collars' that deliver low band ultrasonic sound or electronic shock to deter dingoes. However, all such devices trialled to date have limited practical use because of technical problems in achieving remote synchronisation of the electrical sound/shock with a dingo's 'banned' activity. It is recommended that future effort be aimed at more efficient delivery of rat shot and slingshot deterrent methods (Action 74) rather than electronic devices. | *Market monitored for new advances in ultra sonic deterrents, and trialed if appropriate. *Investigation into more efficient methods of delivering rat shot/slingshot | Completed. Trial completed and unsuccessful. | | Rem |
| 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. | 76 | There has been no progress to date. Given the high success of other methods in minimising dingo-human interactions (fencing, hazing, improved housekeeping, visitor education etc.) and the difficulty in conducting field trials in the public arena (ethical requirements, public perceptions, potential impact on non-target fauna, etc.), it is recommended that this Action is either: • 'Shelved' and re-evaluated at a later date if and when new technology is available; or • Trials by non-QPWS staff are conducted elsewhere to Fraser Island using captive animals in a controlled situation. | Additional research on aversive baiting scheduled/underway. An aversive baiting trial was conducted although the report could not be provided. Although a limitation may be that there are so many variable types of foods, it may be worth further trial. | Not yet achieved. | | M |
| | 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. | 77 | For reasons indicated in Action 76 above, there has been no progress to date. | Additional research on aversive baiting scheduled/underway. | Not yet achieved. Aversive baiting has not been incorporated into any management plans implemented so far. See 4.6 above. | | M |
| | 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. | 78 | Guidelines are reviewed every 3 months and all relevant QPWS staff undergo regular training to maximise consistency in field assessment of dangerous dingo categories. This Action is appropriate and ongoing. | *Guidelines reviewed every 3 months and evidence of appropriate training to ensure consistent response. *Recorded responses deemed to be consistent. | Ongoing and progressing appropriately. Guidelines are regularly reviewed to ensure appropriate behaviour is recorded and identified correctly. All incident reports are completed by appropriately trained QPWS staff, and visitors reporting incidents are questioned to ensure that information is correctly reported and interpreted. Behaviour training by a relevant expert should be initiated for all relevant QPWS staff to ensure appropriate interpretation of behaviour. | | R; N |

| Strategy | Category | Section number | Action 2006 HDMS | Overall action number (used in 2009 audit) | Comments and recommendations from 2009 audit (Corbat) | Indicator (s) to assess 2006 action and 2009 audit recommendations | Evaluation of progress | Progress status | Recommendation |
|---|---------------------------------------|----------------|---|--|---|--|---|---|----------------|
| | Adapting a risk classification system | 5.2 | Justification for the destruction of any dangerous dingoes by trained QPWS staff will be based on a methodology of the regulator's documented history of behaviour against established risk criteria. | 79 | The use of ear tags allows Rangers to confirm the identity of individual dingoes and this provides additional options to humanely destroy dangerous dingoes. This Action is appropriate and ongoing. | <ul style="list-style-type: none"> *Evidence of confirmed identification and documented behaviour history for all dangerous dingoes. *Continued application of ear tags | Ongoing and progressing appropriately. Dingo management histories are maintained on all tagged dingoes. A humane ear tag only ever utilized by monitoring staff to confirm identification of confirmed dingoes. QPWS staff history of aggressive behaviour (i.e. multiple Code D or E incidents only) in the individual's management history and consultation with various QPWS staff. |  | R |
| | 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. | 80 | This Action is appropriate and ongoing. | <ul style="list-style-type: none"> *Protocol for humane destruction developed in consultation with RSPCA and veterinarians, and in place. *Evidence of suitable training for staff approved in humane destruction. | Ongoing and progressing appropriately. The protocol for humane destruction has been approved by animal ethics and was developed using standard methods in consultation with experts. Firearms licenses and proven experience are required by staff euthanising by gunshot, and only QPWS staff authorised under the Health (Drugs and Poisons) Regulation 1996 administer drugs for sedation and euthanasia. Periodic audit: by relevant independent experts (i.e. RSPCA, veterinarians) are recommended. |  | M |
| | Training | 5.4 | Staff will be trained and equipped to humanely trap, handle and euthanase dingoes and to undertake autopsies and data collection. | 81 | This Action is appropriate and ongoing. | <ul style="list-style-type: none"> *Evidence of suitable training for all staff handling, trapping, tagging, collecting data and conducting autopsies. *Suitable equipment available and evidence of regular audit and maintenance. *Improvements in equipment/techniques regularly investigated and incorporated where suitable. | Ongoing and requires progression. Staff training in current methods is sufficient, and detailed elsewhere. Equipment is regularly audited and maintained by QPWS staff. Regular independent review to ensure most up to date methods is required. Improvements to trapping techniques have been identified as part of this review, as detailed in body of the report. |  | M |
| | 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. | 82 | As recommended in Actions 1, 3 & 82, it is now vital for QPWS and relevant researchers to analyse current data sets to assess whether or not the current Fraser Island dingo population is sustainable. It is also recommended that this Action 82 be reworded viz: "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 to a critical low level as a result of direct management action." | <ul style="list-style-type: none"> *Accurate records maintained on humane destruction. *Humane destruction data assessed against population data at least annually. | Ongoing and requires progression. Records are being collected and maintained, but data are not being analysed or fed back into an evaluation of the viability of the population. |  | R |
| 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. | 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. | 83 | As recommended in Actions 1, 3 & 82, it is now vital for QPWS and relevant researchers to analyse current data sets to assess whether or not the current Fraser Island dingo population is sustainable. | <ul style="list-style-type: none"> *Data analysed to assess sustainability of Fringo population, and determine requirement for cull. | Recommended for exclusion. As detailed in the body of the report, if other actions (i.e. To prevent feeding of dingoes) are successful, the dingo population will naturally regulate without interference. Risk potentially associated with lean dingoes that are being denied of resources by dominant individuals should be managed using other strategies rather than culling based on this natural process. |  | Rem |

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|---|--------------------------------------|----------------|---|--|--|--|---|---|----------------|
| | Monitoring | 6.2 | Accurate records will be maintained of the number of dingoes that are removed from the population through a culling program to ensure that this does not lead to a decline in 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: <ul style="list-style-type: none"> researching dingo population dynamics (variations in the size, distribution and density of the population over time) (Corbett 1998a, pp27-15); 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. | 84 | As recommended in Actions 1, 3, 82 & 83, it is now vital for QPWS and relevant researchers to analyse current data sets to assess whether or not the current Fraser Island dingo population is sustainable. It is recommended that the following points be modified viz: <ul style="list-style-type: none"> Monitoring the availability of natural foods; and Managing the Fraser Island dingo population based on phenotypic characteristics of ancestral dingoes viz typical dingo body shape with coat colours from deep red to light sandy ginger, sometimes cream, uniform dorsal coloration, ventrum usually lighter, most with white toes, feet or sox, and white tail tip; occasionally dark muzzles (Corbett 2001, p.36); and culling all other phenotypes. | Dingo population dynamics assessed annually. Availability and supply of natural foods and human-derived foods monitored, recorded and analysed. <ul style="list-style-type: none"> *Data analysed to assess sustainability of Fraser Island population, and determine requirement for cull. *Phenotypic characteristics used to manage Fraser Island population and other phenotypes culled. | Ongoing and requires progression. See 6.1 above. |  | M |
| 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. | 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. | 85 | This Action is appropriate and ongoing. | *Records of continual monitoring of risk factors for all sites. | Ongoing and progressing appropriately. QPWS assess risk daily and using a standardised risk approach each quarter which informs management to maintain levels at a low level. |  | R |
| | Monitoring and review of risk levels | 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. | 86 | This Action is appropriate and ongoing. | *Quarterly risk assessments recorded (or more often if required) using accepted methods. | Ongoing and progressing appropriately. See 7.1 above. |  | R |
| | Monitoring and review of risk levels | 7.3 | Risk calculator variables should be regularly reviewed to confirm their validity. | 87 | This Action is appropriate and ongoing. | *Evidence of regular review of risk calculator variables. | Ongoing and progressing appropriately. A new risk assessment calculator was trialled several years ago, however it was reportedly difficult to use and risk levels were inconsistent with previous calculators. While continual improvement is necessary to ensure accurate risk scores, it is important that such changes are documented and considered when analysing risk changes over time. Subjectivity in calculations must also be minimised to reduce variance between observers. QPWS currently reduce this potential for observer bias by several staff members agreeing on risk. |  | R |
| | Monitoring and review of risk levels | 7.4 | Additional risk assessments will be conducted for all non-protected land tenures on the island, wherever possible utilising cost sharing arrangements. | 88 | This Action is appropriate and ongoing, although there has been no support for cost sharing from land tenures. | *Risk assessment conducted for all land tenures. | Ongoing and progressing appropriately. QPWS includes all sites, regardless of tenure, in risk assessment. Although similarly to reported in the 2009 audit, there has not been cost support from other land managers, improved support from other land tenures is required. |  | R |

| Strategy | Category | Section number | Action 2006 HDMS | Overall action number (used in 2009 audit) | Comments and recommendations from 2009 audit (Corbat) | Indicator (s) to assess 2006 action and 2009 audit recommendations | Evaluation of progress | Progress status | Recommendation |
|----------|---|----------------|--|--|---|---|---|---|----------------|
| | 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. | 89 | This Action is appropriate and ongoing. | *Management actions reviewed at least annually and new technologies incorporated where appropriate. | Ongoing and progressing appropriately. Management actions under the HDMS are independently reviewed through audits and strategy reviews. New technology incorporated into management actions since the 2009 audit include camera trapping, increased microchipping, improved mobile communications within team and current progression to electronic field data capture. A trap-alert system was also trialed, but the network was removed by the provider and so is not possible at this stage |  | R |
| | Reporting | 7.6 | Reporting on implementation of dingo management strategies will occur three monthly. | 90 | This Action is appropriate and ongoing. | *Quarterly reports on management strategy implementation. | Ongoing and requires progression. General management strategies are currently being recorded within each quarterly risk assessment. However this would be improved with more detail (i.e. dates and spatial data) to allow evaluation of success. |  | R |
| | Reporting | 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. | 91 | This Action is appropriate and this audit report represents the scrutiny by an independent auditor. | *Major independent review of the management program every three years. | Ongoing and progressing appropriately. The current review fulfils this action. The next review will be due for completion in the 2015-16 financial year. |  | R |

Categories for progress status








-  Recommended for exclusion
-  Not yet achieved
-  Ongoing and requires progression
-  Ongoing and progressing appropriately
-  Complete









Categories for recommendation



- R Retain
- M modify/combine and retain
- Rem Remove action
- N New action identified





Appendix 20

Action audit - Communication plan 2004 and Implementation Schedule 2010-2015

| | Landmark objective number | Action | Deliverable | Comments | Evaluation of progress | Progress status | Recommendation |
|-------------------------|---------------------------|--|--|--|--|---|----------------|
| Communication Plan 2004 | | | | Comments from 2009 review of communication plan (Environmetrics 2009) | | | |
| 1 | | Continue all ongoing obligations for implementation of the FIDMS. | | | See Appendix 15 - FIDMS action audit. | | |
| 2 | | Communicate findings of 2003 Education evaluation to residents, QPWS staff, commercial tour operators. | * Workshops, newsletters, written summaries, presentations as appropriate for audience. | | Complete. Achieved through e.g. commercial tour operator information sessions, engagement with guides/owners/managers, Sand Paper, media articles, newsletters, radio, TV. |  | Rem |
| 3 | | 3 positive dingo-related articles in local and state mass media, focusing on community benefits. | * minimum of 3 positive dingo-related articles in local and state mass media per year | | Ongoing and requires progression. Unable to get department approval for delivering these. Instead developed 'Sandpaper' as a chatty newsletter and included regular articles about dingoes (always including some dingo-safe message). Difficulty obtaining department approval for mass media needs to be addressed as part of increasing state government support for FIDMS. |  | R |
| 4 | | Develop short radio and TV announcements for Easter 2004; if successful continue in other peak times. | * Radio and TV announcements during peak times, subject to success of trial | Radio and TV segments developed for peak dingo activity times (Easter and Spring). | Ongoing and requires progression. TV presentations provided, including a major segment on Australian Story and sporadic inclusion in Brownie's coastwatch, but these are very expensive and have only been funded sporadically. Attempts to include Fraser Island dingo stories and safety messages on radio and TV during peak times should be continued, subject to cost. |  | M |
| 5 | | Develop new dingo information presentations. | * New presentations developed, tailored to different audiences. | | Ongoing and progressing appropriately. Various presentations have been given, tailored to different audiences. The latest was the presentation to TAT guides - a 1 hour information session featuring ppt presentations, ranger talk-through of the codes and general discussion about rules and best practice. |  | R |
| 6 | | Produce interpretive products aimed at children. | * Interpretive products aimed at children regularly presented to visitors with children and local schools | | Ongoing and progressing appropriately. These have included: dingo brochure including children's section, sticker for children talking to rangers about dingo-safe things they can do while on Fraser Island. Be dingo-aware slogan for children. School presentations have occurred but are limited by funding. |  | R |
| 7 | | Refresh dingo brochure every 18 months. | Refresh dingo brochure every 18 months | This has been done - not specified when. | Ongoing and requires progression. Brochure has been regularly updated, but bureaucratic constraints on approval process for approving new messages has limited ability to update messages. The head office process for considering and approving new dingo safe messages needs to be streamlined to ensure that messages are kept relevant and up to date. Refreshing of dingo brochure should occur at least every 3 years, but should mainly be determined by the need for new messages, as identified by external and internal review processes. |  | M |
| 8 | | Engage residents in dingo monitoring. | Communication activities with residents to engage them in dingo monitoring e.g. resident forums, newsletters | | Ongoing and requires progression. Formal engagement with Fraser Island Association, who have provided written support for QPWS wildlife management on Fraser Island, and other groups. Dingo education campaigns provided for rangers to contact residents face-to-face, some rangers and senior staff informally engage with community members in an informal way. No information available to quantify the extent to which this has occurred, and given that there is still a significant amount of opposition to the FIDMS among residents, efforts should be increased. |  | R |

| | Landmark objective number | Action | Deliverable | Comments | Evaluation of progress | Progress status | Recommendation |
|--|---------------------------|--|--|---------------------------------|--|---|----------------|
| | 9 | Engage tour guides in dingo monitoring. | Communication activities with tour operators to engage them in dingo monitoring e.g. resident forums, newsletters | | Ongoing and requires progression. Tour operators are encouraged to let rangers know about dingo activity and behaviours so they can manage problem dingoes appropriately with early intervention, to avoid destruction if possible. There appears to be no formal involvement of tour operators in dingo monitoring and more should be done in this regard. |  | R |
| | 10 | Interpretive materials or presentations to visitors developed to raise visitor knowledge about dingo identification. | Interpretive materials or presentations to visitors developed to raise visitor knowledge about dingo identification | This has been done (no details) | Complete. Dingo ID messages are included in range of educational products, including web, brochures, signs etc. |  | Rem |
| | 11 | Investigate need for new signage to keep education messages looking new. | New signage communicating key messages and looking new. | This has been done (no details) | Ongoing and progressing appropriately. New series of signs developed 'When on Fraser Island....': Ongoing updates to ensure signs remain in good condition with written sign audit and renewal plan, although rate of progress limited by funds. |  | R |
| | 12 | Develop tour guide and volunteer training re dingo safe messages. | Training programs developed for tour guide and volunteers re dingo safe messages. | | Ongoing and requires progression. Have been conducted but not recently due to funding limitations and difficulty of time availability for guides coming from diverse locations. Need to explore innovative ways to engage with tour guides and volunteers, perhaps including online. |  | R |
| | 13 | Develop visitor questionnaires and run regularly | * Questionnaire developed using robust methodology e.g. through PhD research. *Visitor surveys run every few months. | | Not yet achieved. No research has been conducted to further develop the questionnaire. Running visitor surveys every few months is impracticable given the large costs involved, and seems to be unnecessary for monitoring. This should be replaced by a requirement for visitor surveys at least every 5 years or shortly prior to major reviews of the FIDMS or education strategy, and encouraging collaborative research to further develop the questionnaire and methodology, and administer surveys to answer specific research questions. This should be included in an action regarding research needs to be fulfilled by external parties, and allocated a medium priority. |  | M |
| | 14 | Establish rigorous objective quantitative techniques for assessing risk and incidents. | * Incident reporting conducted using rigorous form and techniques. | | Ongoing and requires progression. Incident reporting is conducted, but techniques and format is not sufficiently rigorous or well-designed, and some information is frequently not entered. Methods and delivery of incident recording needs further work as a matter of high priority. However this action should not be part of education planning - it belongs under dingo management. |  | M |
| | 15 | Engage other EPA units to establish guidelines for presenting dingo information off park, including appropriate presentation of captive dingoes. | * Communication with other Qld govt units and captive dingo facilities to include appropriate messages about wild dingoes. | | Not yet achieved. This has stalled. Efforts should be recommenced to investigate whether these facilities continue to disseminate messages about dingoes that are in conflict with those of the Dingo Safe program, and if so to engage with them as needed regarding changes to messages. |  | R |
| | 16 | Phase out 'be dingo aware' materials and phase in dingo safe' campaign. | By 2007, complete replacement of slogans and messages as specified by dingo safe campaign. | This has been done. | Ongoing and requires progression. Expected to be achieved by end of this year but has been delayed due to funds only becoming available in 2011 for replacement of old, out-of-date and aging signs. |  | R |

| Landmark objective number | Action | Deliverable | Comments | Evaluation of progress | Progress status | Recommendation |
|--|--|--|---|--|---|----------------|
| Implementation Schedule - Fraser Island dingo communication and community engagement 2010-2015 | | | Internal audit comments, October 2012 | | | |
| | Develop and implement an issue management plan. | Issue management plan report. | Consulted with industry and internal staff, produced quick response leaflet for visitors re aggressive dingos reports complete, website information provided to debunk myths and misinformation through website. Internal communication strategies to deal with emergent/urgent issues ongoing. | Not yet achieved. Decision made to address urgent/emergent dingo management issues as part of regional Emergency response plans instead. The plans provide for internal communication strategies and other measures for dealing with these issues by operational staff. Education staff are not closely involved in this process, though may be called upon to assist. In addition, a quick response leaflet has been developed for visitors regarding aggressive dingo reports, and the website has been updated with information to address perceived myths and misinformation. It is not clear from this review whether this process is appropriate and adequate for dealing with acute dingo management issues. This should be addressed through a meeting between key staff involved in Fraser Island dingo management (including regarding education) and regional staff involved in the emergency response plans. A copy of the minutes of this meeting, including reasons for decisions, should be made available for the next external review. |  | M |
| | Develop and implement a community engagement plan. | A community engagement plan report | Social marketing practices investigated. Social marketing actions ongoing. New dingo communication positions; one new position; one temporary position now ended. Seasonal dingo education campaigns ongoing. | Ongoing and requires progression. A new community engagement position has been created. A draft community engagement plan has been developed, including many education-related actions, and is part way through the internal review process. However, the current review has recommended elsewhere that planning for education and community engagement activities be consolidated within an updated version of the Communications Plan. There may be reasons why community engagement should continue to be separated from education in the planning process, but if so these need to be articulated, and an appropriate division provided between the Communications Plan and the community engagement plan, with minimal overlap. |  | M |
| | Regular sign renewal. | A sign renewal audit and plan has been produced, and is being implemented. | Sign renewal plan completed. Construction of new signs started to be completed in 2014. New dunny door poster. | Ongoing and requires progression. A sign renewal audit and schedule (plan) has been produced, and is being implemented. Progress has been delayed by funds. Combine this action with the related one for the Communications Plan. |  | M |
| | Visitor surveys at least every 5 years. | Visitor survey report available by 2008 | Visitor survey undertaken in early 2012. Another planned for early 2015. | Ongoing and progressing appropriately. Last visitors survey was in 2011-12, more than 5 years since that conducted as part of the 2003 education review. This was delayed due to cost. The next visitor survey has been planned for 2014-2015, which is appropriate. This action is also covered by the Communications Plan action above, and the two should be reconciled. |  | M |
| | Monitor and respond appropriately to web-based social media. | Plan for monitoring and responding to social media. | Investigation of how to monitor and respond to social media comments partially completed; awaiting establishment of protocols and approvals. Social media monitoring underway. Plan for input into social media on hold pending development of protocols. | Not yet achieved. Monitoring of websites through an automated website search function is in place, and some further monitoring of social media sites is being carried out by rangers. No responding to social media has occurred - this is awaiting approval and development of policy and protocols by head office. This should be pursued as a matter of high priority. |  | R |

| Landmark objective number | Action | Deliverable | Comments | Evaluation of progress | Progress status | Recommendation |
|---------------------------|---|---|---|--|---|----------------|
| | Additions to QPWS website. | New web pages with dingo information covering all dingo safe messages, and regularly updated. | Fraser Island dingo-specific web pages developed. Further updates pending FIDMS review. | Ongoing and progressing appropriately. New web pages with links to other relevant web pages now in place and these are regularly updated. Last update was stalled due to announcement of FIDMS review. |  | R |
| | Beyond basic behaviour messages. | New educational materials are produced including beyond basic behaviour messages, and targeting all main audience groups. | Employment of communication strategies with more emphasis on context, relation to FIDMS rationale, employment of social marketing strategies - ongoing. Social marketing workshop delivered to staff. | Ongoing and requires progression. Planning to incorporate social marketing techniques in educational products is underway and a staff workshop has been delivered. Educational materials including dingo management issues are being planned. The dingoes of Fraser Island brochure was developed with extensive internal consultation and with consultants, to include beyond basic behaviour messages and have an associated long-readability factor, to allow for readers to adequately digest these messages and to influence attitudes with regard to beyond basic behaviour messages, including dingo management and ecology. Further development of beyond basic behaviour messages and materials should be undertaken, taking into account results and recommendations of the present review. |  | R |
| | Gather and promote information on QPWS as effective dingo managers. | Gather publications, publish internal research, produce educational materials including messages supporting QPWS as effective dingo managers. | Gathering of information ongoing. Publication of internal studies, reviews and reports completed and ongoing. | Ongoing and requires progression. Publications are in the process of being gathered. Publication of internal research has stalled as identified elsewhere in the present review. Signage is being developed to include how dingo management is being conducted and why, but this has been delayed since the review was announced. All these efforts should be continued, and obstacles addressed. |  | R |
| | Review Fraser Island visitor guide. | New Fraser Island visitor guide produced with enhanced dingo safe messages and beyond basic behaviour messages. | New visitor guide with enhanced dingo safe messages produced. New dingo brochure developed and first distributed April 2011, but print run stopped June 2012 by Minister NPRSR. | Complete. Guide has been reviewed and refreshed, and now includes additional dingo safe messages and messages regarding ecology and management, as well as a simple children's activity. |  | Rem |

| Landmark objective number | Action | Deliverable | Comments | Evaluation of progress | Progress status | Recommendation |
|---------------------------|--|--|--|--|-----------------|----------------|
| | Continue face to face ranger program and consider additional resources for this. | Campground 'briefings' are maintained at existing level or increased, and are increased at peak visitor times. Options for obtaining additional resources for this have been explored. | Face to face ranger program continued, including ongoing campground briefings and campaigns with additional measures at peak times since Dec 2011. Some investigation of extra resourcing undertaken, but staff resources are stretched. Temporary new position in community engagement Dec 2010- Sep 2011 now discontinued. One new community engagement ranger since March 2012. Provided tagalong tour guide information sessions to commercial tour operators partially completed. Community engagement sessions with residents commenced July 2012 and ongoing. | Ongoing and progressing appropriately. Campground briefings have continued, and are supplemented by 'campaigns' with additional efforts at peak visitor/risk times. Two new ranger positions with responsibilities to support other rangers in public contact have been appointed, but one of these was based on temporary funding and has apparently now ended. Given the apparent importance of public contact, ongoing efforts should be made to obtain additional staff resources. This action should be combined with a similar action elsewhere in this audit. | <div></div> | Rem |

Categories for progress summary

Recommended for exclusion
Not yet achieved
Ongoing and requires progression
Ongoing and progressing appropriately
Complete

R

Retain

M

Modify/combine and retain

Rem

Remove action

N

New action identified

Revision History

| Revision number | Revision date | Details | Prepared by | Reviewed by | Reviewed and approved by |
|-----------------|---------------|---|--|--|--|
| 00 | 29/11/2012 | Fraser Island Dingo Management Strategy Review – Draft Report | Jessica Boswell Senior Wildlife Biologist Ben Allen Dingo Ecologist Dr Karen Higginbottom Ecologist | Dr Alan House Senior Ecologist Dr Grant Brearley Senior Wildlife Biologist | Scott Hetherington Regional Manager |
| 00 | 21/12/2012 | Final Fraser Island Dingo Management Strategy Review – Final Report | | Jessica Boswell Senior Wildlife Biologist Ben Allen Dingo Ecologist Dr Karen Higginbottom Ecologist | Scott Hetherington Regional Manager |

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| 7 | 21/12/2012 | electronic | Review Steering Committee | Professor Hugh Possingham |
| 8 | 21/12/2012 | electronic | | Ms Sue Sargent |
| 9 | 21/12/2012 | electronic | | Professor Clive Phillips |
| 10 | 21/12/2012 | electronic | | Professor Chris Johnson |
| 11 | 21/12/2012 | electronic | Ecosure | Administration |

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