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Department of Agriculture

AGRICULTURE PROTECTION BOARD OF WA

WESTERN AUSTRALIAN WILD DOG MANAGEMENT STRATEGY 2005

CONTENTS

Abbreviations

APB	Agriculture Protection Board
ARRPA	*Agriculture and Related Resources Protection Act 1976*
AWA	*Animal Welfare Act 2002*
DSG	Declared Species Group
DAG	Declared Animal Group
DAWA	Department of Agriculture Western Australia
DCG	District Consultative Group
CALM	Department of Conservation and Land Management
DLGRD	Department of Local Government and Regional Development
ILC	Indigenous Land Corporation
LG	Local Government
LCDC	Land Conservation District Committee
SWDMAC	State Wild Dog Management Advisory Committee
VPRS	Vertebrate Pest Research Section (DAWA)
WDMG	Wild Dog Management Group
ZCA	Zone Control Authority
1080	Sodium fluoroacetate

EXECUTIVE SUMMARY

Wild dogs (*Canis familiaris, Canis familiaris dingo* and hybrids) are one of the major pest species of livestock grazing industries in Western Australia and Australia. Wild dogs are defined as all wild-living dogs (including dingoes and hybrids). The aim of the wild dog management strategy is not to eliminate wild dogs from the State, but to control their impact on domestic stock.

Although dingoes are unprotected fauna in WA under a subsidiary notice of the Wildlife Conservation Act 1950, they are fauna protected under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. The Animal Welfare Act 2002 provides for the welfare, safety and health of all vertebrate animals in WA except fish. While the Act does not prohibit the killing of an animal there is an obligation to be as humane as possible.

The control of wild dogs has taken many forms over the last two hundred years. Many of the traditional control techniques used during that time still have relevance today, while others are no longer used as society's acceptance of them has changed or improved methods have become available.

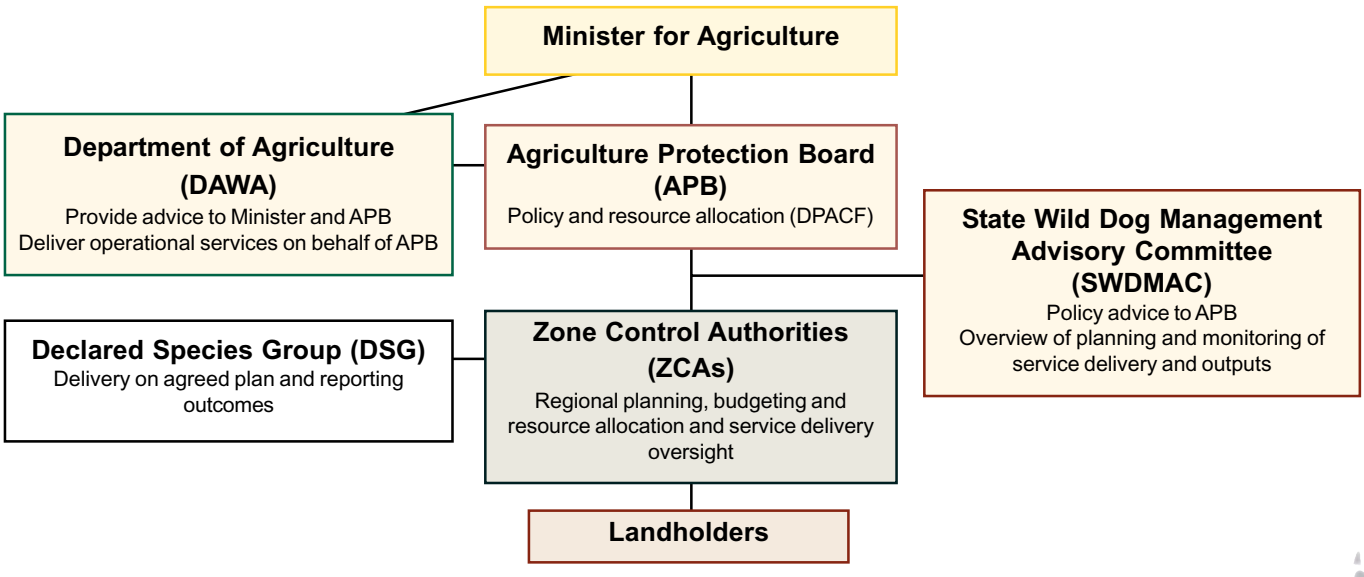
The future challenge is to ensure that existing wild dog control techniques are used safely and humanely and effectively as possible, that new techniques are developed to achieve control and address community issues, and that all stakeholders recognise and participate cooperatively in wild dog management.

A State-wide strategy is essential to enable the community to manage the impacts of wild dogs effectively. All land managers (both private and public) and the community need to be involved in a focused partnership that will provide the basis for the management of the impact of wild dogs in Western Australia.

The approaches taken will depend on the risk profile of the relevant industries:

- Sheep/goats (*highest risk, zero tolerance of wild dogs*). Requires intensive control on the specific enterprise, aiming for a zero impact from wild dogs, and the creation of an effective buffer in neighbouring country harbouring wild dogs (regardless of the status or tenure of that adjacent land).
- Cattle (*varying risk, usually can tolerate low to moderate and sometimes even high numbers of wild dogs*). Control to be undertaken to significantly reduce the risk of attacks on cattle. A more sustained reduction can be achieved when control work is coordinated with neighbours. Intensive control is required when the property is adjacent to a sheep/goat enterprise.
- Unstocked country (*Unallocated Crown Land, Reserves, mining leases, absentee owners, etc - no risk except when it borders stocked country, although the risk will vary with type of stock*). Intensive control is required when forming part of a buffer adjacent to sheep/goat enterprises. Often no control is warranted when adjacent to cattle country, unless that cattle country is undertaking intensive control because of specific risks (calving/weaning areas etc.).

WILD DOG MANAGEMENT WITHIN WESTERN AUSTRALIA



STRATEGY GOAL

To minimise the impact of wild dogs on economic and community values through the implementation of a community supported strategic approach to wild dog management on both private and public land that contributes to the protection of livestock while supporting the conservation of pure dingoes in other areas of the state.

Scope of the strategy

This strategy has been established to address all wild dog impacts within Western Australia. It is linked to other planning frameworks as shown in the strategy matrix (Table 1), and draws on activities at the property level.

Wild dog management, under the various legislation, is the responsibility of the land manager, including the managers of all private, leasehold and public land.

In addition, the Government's role in wild dog management includes the provision of an appropriate legislative and policy framework providing research, advice and assistance on best practice management. It ensures effective humane and economic management of the impacts of wild dogs from public land by the agencies responsible for management of that land.

Implementation of the Strategy will effectively coordinate strategic and sustained wild dog management statewide across all land tenures[1] in a way that:

- Creates effective long-term partnerships within the community to ensure that wild dog management priorities are clear and reflected in Regional Wild Dog Management Plans;
- Is based on recognised best practice[2] wild dog management and focuses principally on the protection of livestock rather than destruction of wild dogs;
- Recognises that the implementation of best practice wild dog management must be managed effectively and accepted within the community;
- Ensures a coordinated and cooperative management approach between public and private land managers;
- Improves community knowledge and understanding of the wild dog problem, impacts of wild dogs and ensures skilled and effective community participation in management activities.

Effective wild dog management will involve close integration of policy, research, on-ground management and monitoring if it is to achieve the goals of the Strategy.

The Strategy has seven components:

- Effective statewide coordination of the wild dog program;
- Implementation of best practice wild dog management on both private and public lands;
- Targeted research for best practice wild dog management;
- Effectively manage a whole of community response (private and public land managers) to the wild dog program;
- Encourage increased government participation including local government;
- Monitoring, evaluation and reporting of wild dog activity and impact;
- Broader community awareness of wild dog issues.

[1] All Tenure **(nil tenure)** involves the removal of property boundaries from maps and substituting them with criteria of landscape relevance such as vegetation type. By collectively identifying the scope of the issue, the control techniques available and the level of resources required, the **nil tenure** approach allows management strategies to be formulated at the landscape level.

[2] **Best Practice** involves integrating multiple techniques in a planned way, taking account of overall land management, species biology, and other variables; ie using the best information and techniques available to better manage the impacts of the pest.

Table 1: Context and relationship of the Western Australian Wild Dog Management Strategy to planning initiatives at other levels

Scope / Scale	Natural Resource Management (NRM)	Pest Management	Pest species
National	National Strategy for the Conservation of Australia's Biological Diversity National Rangelands Guidelines National NRM Statement New Australian Animal Welfare Strategy	National Vertebrate Pest Strategy (proposed)	National Wild Dog Strategy (proposed) Managing the impacts of dingoes and other wild dogs
State	Western Australian Biodiversity and NRM Strategy (proposed)	Western Australian Vertebrate Pest Strategy (proposed)	**Western Australian Wild Dog Management Strategy**
Regional	Regional NRM Strategy and Plans	Regional Pest Management Plans (proposed)	Regional (ZCA) Wild Dog Management Plans (proposed)
District			WDMG (DSG) Management Plans (proposed)
Property	Property NRM Management Plans	Property Pest Management Plans	Property Wild Dog Management Plans

PRINCIPLES OF THE STRATEGY

The development and implementation of this strategy are based on the following pest management principles:

1. **Consultation and partnership.** Consultation and partnership arrangements between landholders, local communities, industry groups, State government agencies and local governments must be established to achieve a collaborative and ongoing approach to pest management.
2. **Commitment.** Effective pest management requires a long-term commitment by the community and government.
3. **Public awareness.** Public awareness and knowledge of pests and their impacts must be raised to increase the acceptance, capacity and willingness of individuals to humanely control pests.
4. **Prevention.** Effective pest control is achieved by:
   - ∉ preventing the spread of pests by human activity;
   - ∉ early detection of pests, and early intervention to control their spread and adverse impacts.
5. **Ecological processes.** Pest control techniques that have the least impact on, and reinforce the resilience of, ecological processes must be used as much as is practical.
6. **Integration.** Pest management is an integral part of managing natural resources and production systems for the longer term.
7. **Planning.** Pest management planning must be consistent at local, regional, state and national levels to ensure that:
   - ∉ domestic and international obligations about pest management are met;
   - ∉ a widespread, effective planning process is maintained across the landscape to target the priorities of affected stakeholders;
   - ∉ all available resources are efficiently used to target priorities identified under state, national and international best practice management.
8. **Research.** Ongoing research is essential to achieve continuous improvements in pest management practices.
9. **Monitoring and evaluation.** Regular monitoring and evaluation of pest occurrence and control activities is necessary to achieve continuous improvements in pest management practices.
10. **Animal Welfare.** The strategy recognises the inherent welfare issues associated with the control of wild dogs, as well as the expectation of the community that all animals, including pest species, are treated as humanely as possible. Any control program must:
    - ∉ recognise that wild dogs require the same level of consideration for their welfare as that given to domestic and other animals;
    - ∉ be conducted as humanely as possible, be target specific and not cause suffering to non-target animals.
    - ∉ comply with the Animal Welfare Act 2002 (AWA) and its supporting regulations.

Objectives

Objective 1: Improve the statewide coordination of the wild dog program

It is essential that the community has input into the planning and management as well as the ownership of the wild dog program. A new approach is required to ensure that this occurs. As a result, regionally based and community formed Wild Dog Management Groups (WDMGs) will be established and based within the Zone Control Authority (ZCA) structure. These Management Groups will be required to set the strategic and funding directions for the operation of the wild dog program in their region, taking into account best practice wild dog management. A key component of the strategic direction setting will be the development of Regional Wild Dog Management Plans.

	Action	Responsible body	Time frame
1.1	Establish a State Wild Dog Management Advisory Committee (SWDMAC) for planning and evaluation of state control programs and develop an effective inter-Government collaboration with State agencies involved in wild dog management.	**APB**, DAWA	May 04
1.2	Establish Wild Dog Management Groups (WDMG), utilising existing ZCA and community groups, for planning and implementation of local/regional control programs.	**ZCA,** DAWA LCDCs, LG	June 06
1.3	Involve public land managers in WDMG	**DAWA,** ZCAs, CALM, LG, ILC and other land managers	Dec 05
1.4	Develop and implement Regional Wild Dog Management Plans	**ZCA,** ZCAs, LG, CALM, ILC,	June 07
1.5	Facilitate and conduct wild dog program workshops to ensure coordination between WDMGs, information flow regarding research results and needs, and maintenance of collaboration with relevant information and personnel.	**ZCA**, **DAWA** CALM, ILC and other land managers	Ongoing
1.6	Approach Government to provide improved resources, including DAWA staff, increased funds for doggers, baiting etc. and seek funding for ongoing R&D.	**APB** DAWA, CALM, ILC and other land managers	Ongoing

	Performance Indicator	Method of Verification
Measure 1	Number of regional plans fully endorsed by SWDMAC. (Currently 7 regions – Kimberley, Pilbara, Carnarvon, Meekatharra, Kalgoorlie, Esperance, Merredin).	Achievement against actions 1.1 to 1.6
Measure 2	Proportion of land managers participating in the planning process.	Audit of land managers participating.

Objective 2: Implementation of best practice wild dog management on both private and public lands

Wild dog management techniques will be effective, safe, humane as possible and appropriate to limiting the damage caused by wild dogs to livestock. Research in WA and interstate has shown that wild dogs are relatively sedentary, and do not routinely travel significant distances to attack livestock. The highest risk to stock comes from wild dogs residing within the paddocks, or from adjacent country. It follows that management effort should be directed towards those high-risk areas. For the highest-risk enterprises such as sheep properties, the aim is to remove wild dogs from the paddocks, as well as from an adjacent and appropriate buffer zone, using a mix of best practice management techniques to minimise the risk of movement into the cleared paddocks. The strategy requires that the buffer zone be maintained whatever the tenure of that particular land (public, private, pastoral leasehold, mining, etc). For lower-risk enterprises (most cattle properties), the strategy requires the use of best practice techniques to reduce wild dog numbers in the stocked country.

With the focus on best practice wild dog management, it is recognised that to be effective, techniques such as trapping, baiting, shooting, barrier and electric fencing must be carried out at a high level of efficiency and closely integrated with each other. The use of these techniques must also satisfy requirements of Acts and Regulations including the Animal Welfare Act, Poisons Act and Firearms Act. Programs must be well planned and based on a clear view of what is to be done and how effectiveness is to be measured.

Management strategies, their relative emphasis and the means by which they are to be implemented in a region, will be developed by each WDMG, and form part of their respective Regional Wild Dog Management Plans. It should be noted that not all techniques will be applicable in all regions.

	Action	Responsible body	Time frame
2.1	Focus wild dog management activities on recognised best practice and nil tenure approach.	**SWDMAC,** WDMGs, DAWA, CALM, ILC and other land managers	Ongoing
2.2	Develop poisoning, trapping and fencing strategies as part of the Regional Wild Dog Management Plan.	**WDMGs, DAWA**	Ongoing
2.3	Ensure risk assessments are completed for all 1080 and strychnine use.	**DAWA**	Ongoing
2.4	Enforcement of ARRPA under sections 50, 51, 52 and 58 to ensure non compliance of landholders is acted upon swiftly.	**APB/DAWA**	Ongoing
2.5	Promote that all ground operations, doggers and contract aircraft used for aerial baiting are equipped with, and use, GPS navigation to ensure baits are laid where required and recorded.	**DAWA** WDMGs, ZCAs, CALM	Ongoing
2.6	Training of land managers in best practice wild dog management.	**DAWA** WDMGs, ZCAs, DAG	Ongoing
2.7	Formalise Best Practice Document	**DAWA**	Ongoing

	Performance Indicator	Method of Verification
Measure 1	Number of regional plans utilising best practice techniques.	Audit of regional plans to confirm adoption of best practice.
Measure 2	Proportion of land managers implementing planned wild dog program.	Audit of land managers participation.
Measure 3	Proportion of land managers implementing individual on-property ground baiting.	Audit of land managers purchasing ground baiting resources.

Objective 3: Targeted research for best practice wild dog management

Research into best practices for wild dog management will be targeted to enhance the strategic approach outlined in this strategy, and will be readily applied in the field and made available to the community. High priority will be given to research activities that support the effective implementation of this strategy and assist resource decisions within Regional Wild Dog Management Plans.

	Action	Responsible body	Time frame
3.1	Align priorities for research to addressing knowledge gaps identified in key documents, including Regional Wild Dog Management Plans and to targeting long-term solutions	**SWDMAC,** WDMGs, DAWA, ZCAs, CALM	Ongoing
3.2	Assess existing techniques for best practice wild dog management	**DAWA, DLGRD**	Ongoing
3.3	Develop safe, effective and humane management techniques	**DAWA, DLGRD**	Ongoing
3.4	Review new and current research Aust wide. Make research summaries available to the DCG, ZCA and community	**DAWA, DLGRD**	Ongoing
3.5	Undertake and coordinate research for new baits; evaluate bait uptake, attractants and lures	**DAWA, CALM, DLGRD**	Ongoing

	Performance Indicator	Method of Verification
Measure 1	Number of agreed high priority research projects undertaken.	Research projects received by SWDMAC.
Measure 2	Number of research recommendations that are adopted in the regional plans.	Audit of regional plans.

Objective 4: Effectively build community capacity (private and public land managers) to implement the wild dog program

It should be recognised that any change of focus in the wild dog program will need to be managed and accepted within the community, with progressive achievements over a period of time. The process for change will be aided through the development of extension programs, clear communication processes and training activities that recognise that change is often difficult and requires support.

	Action	Responsible body	Time frame
4.1	Community communication channels will be identified and used to distribute information relating to the wild dog program	**APB** all groups and agencies	Ongoing
4.2	Consult with the community as part of the Regional Wild Dog Management Plan development process.	**ZCA,** WDMGs, LG, DCGs, LCDCs, SWDMAC	June 06
4.3	Produce a Best Practice Handbook and make it available to the community	**DAWA, DLGRD**	June 06
4.4	Produce new, or update existing Farmnotes on key aspects of the program and make widely available.	**DAWA, DLGRD**	Ongoing
4.5	Identify training needs of DAWA staff involved in wild dog management and implement an appropriate program to ensure a high level of relevant skills are available to the wild dog program.	**DAWA**	Ongoing

	Action	Responsible body	Time frame
4.6	Undertake landholder and land manager training in 1080 and strychnine use.	**ZCA/DAWA**	Ongoing
4.7	Undertake landholder training in best practice ground control including trapping, poisoning and shooting	**APB,** TAFE, WDMGs, DAWA	Ongoing
4.8	Enforcement of ARRPA under sections 50, 51, 52 and 58 to ensure non compliance of landholders is acted upon swiftly	**APB,** DAWA	Ongoing

	Performance Indicator	Method of Verification
Measure 1	Number of land managers (public and private) aware of best practice.	Survey results of best practice awareness.
Measure 2	Number of land managers accredited for poison use.	Audit of land manager accreditation.

Objective 5: Ensure regulatory powers are utilised to address non-compliance.

Implementation of a nil tenure approach to wild dog management necessitates that all managers participate in planned coordinated management on both private and public land (see Action 1.2). Public land managers have a responsibility to manage wild dogs on land vested in them or managed by them. There are several Acts of legislation that affect wild dog management, including ARRPA, AWA, Dog Act, Health Act, Poisons Act etc.

Local government is responsible under the *Dog Act 1976* for controlling domestic dogs. Inadequate management of domestic dogs is increasingly seen as the source of some wild dog problems in urban and rural areas. Local government, through the Dog Act, need to ensure domestic dogs do not compound regional wild dog problems. This will be done by:

- coordinating activity with WDMGs as part of a regional approach to wild dog management; and
- enforcing provisions under the Dog Act 1976, especially those relating to registration, confinement and straying.

Local governments that have had General Inspectors appointed under the Animal Welfare Act 2002 also have wide powers in relation to prosecuting anyone who is cruel to an animal. Cruelty includes abandoning an animal, whether at the place it is normally kept or elsewhere. A person, whether or not the person is the person in charge of an animal, is also cruel if he or she causes an animal unnecessary harm in any way. It is possible that a dog owner who allowed his or her dog to roam and the dog attacked livestock could be charged with cruelty over the injured stock.

	Action	Responsible body	Time frame
5.1	Review and establish minimum standards of each legislative Act.	**APB,** DLGRD	Ongoing
5.2	Encourage administrative authorities to implement regulatory requirements.	**APB, ZCA LG,** CALM, ILC, and other land managers, DLGRD	Ongoing
5.3	Benchmark compliance under each Act of legislation.		

	Performance Indicator	Method of Verification
Measure 1	Proportion of change in compliance implemented under each Legislative Act.	Benchmark non compliant land managers becoming compliant.

Objective 6: To achieve agreed levels of monitoring, evaluation and reporting

Objective reporting by private land managers on issues relating to wild dog damage to livestock is a critical component of this strategy. In the past this has been fragmented and in some instances poorly understood and carried out. Prompt reporting of stock losses is essential for coordinated and effective management to be carried out and for guiding resourcing decisions by WDMGs. This reporting will form part of a community-based monitoring program of the damage caused by wild dogs to livestock. The reporting of attacks and wild dog activity and requests to WDMG for assistance in wild dog management will be coordinated through a clearly defined process, with a designated WDMG member as the first point of contact for landholders.

It needs to be recognised that if control is being carried out effectively, the level of stock losses will be low. It is essential that resources are targeted to areas where there are well planned and implemented programs rather than to areas that have high stock losses due to poorly planned and conducted control.

	Action	Responsible body	Time frame
6.1	Develop the appropriate templates to collect, collate and distribute all wild dog information and data to all associated parties	**DAWA** CALM, WDMGs, ZCAs, SWDMAC	Dec 05
6.2	Revise the reporting requirements for land managers (and doggers) to ensure appropriate monitoring data is collected.	**SWDMAC**, WDMGs, DAWA, ZCA	Dec 05
6.3	Coordinate the requests for assistance through the WDMG.	**WDMGs**	Ongoing
6.4	Develop and implement a system for recording wild dog program activity and control.	**DAWA**, WDMGs, SWDMAC,, ZCA	Dec 05

	Performance Indicator	Method of Verification
Measure 1	Proportion of land managers monitoring and reporting wild dog activity in a timely manner.	Audit of information received.
Measure 2	Number of ZCAs that provide monitoring results and evaluation of those results to SWDMAC.	Audit of reports.

Objective 7: Raise community awareness of wild dog issues

The capacity to manage wild dogs will be affected by broader community attitudes and perceptions about impacts and control methods. Public opinion influences not only the type of management strategies that are developed but also the type of control methods that may be deployed. Wider public attitudes rightly demand that the techniques used in wild dog control must be as humane as possible and expose non-target animals to minimal hazard. Management strategies that do not address or acknowledge broad community attitudes are susceptible to disruption or interference.

It is essential that the broader community is aware of the impact of wild dogs and of management strategies to minimise that impact

	Action	Responsible body	Time frame
7.1	Develop a wild dog awareness program.	**SWDMAC, DLGRD,** WDMGs, DAWA	Dec 05
7.2	Encourage public support for wild dog management activities through awareness programs.	**SWDMAC, DLGRD,** All groups	Ongoing
7.3	Publicise the agricultural, environmental and social impacts of wild dogs.	**APB, DLGRD,** All groups	Ongoing
7.4	Develop and promote a balanced perspective on controversial wild dog issues.	**SWDMAC**, All groups	Ongoing

	Performance Indicator	Method of Verification
Measure 1	Percentage of urban community aware of wild dog issues.	Survey.
Measure 2	Percentage of rural and regional community aware of wild dog issues.	Survey

Opportunities and constraints

This strategy will provide opportunities for:

- improved communication mechanisms;
- improved general awareness;
- wider community support for wild dog control;
- coordination of management efforts;
- documenting management plans;
- more effective use of resources;
- improved participation in and acceptance of control;
- improved data collection and research;
- greater recognition of animal welfare issues.

It should be recognised that the successful implementation of the strategy may be limited by:

- rural downturn - particularly in the sheep and wool industry;
- competing stakeholder priorities and varying levels of commitment;
- difficulty enforcing wild dog control;
- expectation that the State Government should increase its role as 'partner' in wild dog control;
- diminishing government resources (e.g. trained staff, funding) may prevent implementation of actions;
- potential conflict between the pest and conservation status of dingoes;
- concerns over non-target impacts of baiting;
- animal welfare and rights issues.
- poor interface with local governments and community.

Evaluation of the strategy

The State Wild Dog Management Advisory Committee will oversee the implementation of the strategy, which will be reviewed on a six monthly basis and a progress report submitted to the Agriculture Protection Board.

Appendix 1- State Wild Dog Management Advisory Committee

Background

The need for increased stakeholder involvement in associated policy and planning processes was one of five key findings of the recent industry evaluation of the State's Wild Dog Control Program.

A Wild Dog Advisory Committee with representation inclusive of all stakeholders has been formed at State level. The Committee will provide the Agriculture Protection Board (APB) and the Department of Agriculture (DAWA) with a strengthened whole-of-industry and community perspective at the State level, whilst simultaneously supporting an expanded role for local participation and ownership in conjunction with the Board's existing Zone Control Authorities. Whereas the ZCAs have responsibility across all declared plant and animal species, the Wild Dog Advisory Committee will be focused exclusively on wild dogs.

It is expected the Committee will review the effectiveness and efficiency of the Wild Dog Control Program, from the landholder perspective, at least twice annually (immediately after the last baiting run and before the next following run). The purpose will be to alert the Board to areas of concern and/or to offer advice/make recommendations for general improvement.

Terms of reference

The Terms of Reference of this Committee include:

- Provision of policy advice and recommendations to the Agriculture Protection Board on all issues associated with the Wild Dog Management Program, including such issues as
  - operational procedures required
  - research and development direction
  - outcomes to be achieved
  - priorities
  - resource allocation
  - regional issues with wild dogs
  - other matters as necessary
- Regularly review the performance of the Wild Dog Program and recommend changes for Agriculture Protection Board consideration where necessary;
- Provision of a forum for communication with industry and Zone Control Authorities

Membership

Committee membership will include;

- One representative from the Agriculture Protection Board
- Three practicing producers to represent WA's pastoral Rangelands (Kimberley/Pilbara, Carnarvon/Meekatharra, Kalgoorlie)
- Two practicing producers to represent WA's eastern agricultural area (Merredin/Lake King, Ravensthorpe/Esperance)
- One senior representative from Department of Conservation and Land Management
- One senior representative from Department of Local Government and Regional Development
- One senior representative from indigenous land managers
- One senior representative from Local Government (LG)
- One senior representative from the mining industry
- One senior representative from the community

The Committee will be reviewed on an annual basis and will be chaired by the Agriculture Protection Board.

General Operation

The APB will have regard for the Committee's advice whilst retaining ultimate legal and financial accountability for the Wild Dog Program. DAWA will provide executive and technical support to the committee.

Each member of the Committee will have a broad understanding of agricultural industry, experience in financial management or other skills and experience relevant to the Committee's functions.

Members to be reimbursed from the DAWA's Consolidated Fund budget for Wild Dog Management for all travel, accommodation and other approved expenses incurred in the course of Committee business.

Sitting fees will NOT apply, Members' time being deemed to be a contribution to their respective industries. In recognition of this fact, care will be taken to limit the demands on Member's time.

Appendix 2 - Stakeholder responsibilities

All stakeholders will need to assist with the development of area-specific management plans. The general responsibilities of each of the major stakeholders in wild dog management are listed below.

All land managers (private and public, including Commonwealth and State lands)

- Participate in organised groups for coordinated control.
- Conduct population and damage assessments for their lands.
- Assist in the laying of baits and maintain a record of areas baited and areas of current wild dog activity.
- Conduct control programs using the most appropriate and effective methods available for the particular situation.
- Notify neighbours and erect warning signs around baited areas.
- Monitor the effectiveness of control techniques.
- Participate in the program review process

Industry groups

- Promote availability and conditions of use of control agents.
- Promote the need for, and assist with, formation or operation of landholder groups for coordinated control.
- Raise awareness of control issues with the media.
- Participate in the review of the program

Community and conservation groups

- Review and participate in education, information, conservation and planning processes.

Local government

- Regulate the control and improve the welfare of domestic dogs.
- Participate in review of program outcomes in their areas of responsibility

Wild Dog Management Groups

- Develop Regional Wild Dog Management Plans
- Ensure best practice wild dog control is undertaken.
- Assist with the formation of landholder groups; organise coordinated baiting campaigns; and provide 1080 impregnation of baits in association with DAWA.
- Coordinate and monitor baiting campaigns in conjunction with DAWA.
- Provide advice on various wild dog control techniques
- Review program delivery and outcomes in their region.

Department of Agriculture

- Policy development and planning.
- Manage 1080 administration in Western Australia.
- Facilitate the State Wild Dog Management Advisory Committee.
- Ensure appropriate links and communication between internal and external stakeholders within their area of responsibility.
- Identify and address operational issues associated with control operations within their area of responsibility.
- Seek greater cooperation from departments managing public lands.
- Undertake wild dog extension activities, including provision of up to date advice on various possible control techniques.
- Encourage land managers to control wild dogs, and encourage the formation of landholder groups.
- Coordinate and monitor baiting campaigns.
- Organise or provide 1080 impregnation of baits in association with Zone Control Authorities.
- Undertake population and damage assessments and collect impact data.
- Investigate complaints.
- Contribute to the program reviews and monitor outcomes
- Monitor effectiveness of control agent(s).

- Investigate additional control techniques.
- Develop methods for population modeling.

Other State Government agencies/ authorities/committees

Agriculture Protection Board (APB)

- Provide policy advice and direction on declared pest animal management.
- Facilitate greater integration between ZCAs, local government and industry.

Department of Conservation and Land Management

- Develop and promote a management plan for the conservation of dingoes.
- Control and exclude all other dogs from protected areas as per policy.
- Assess and, where appropriate, provide approval for wild dog control on Conservation estate and managed lands.
- Determine the genetic status of dingoes and hybrids.
- Identify suitable areas and populations for dingo conservation.

Department of Health

- License operators for use of 1080 and strychnine.
- Dog health programs.

Department of Local Government and Regional Development (DLGRD)

- Provide advice on the Dog Act 1976 and the Animal Welfare Act 2002.
- Assist in achieving cooperation of local governments in relation to wild dog control.
- Assist in objective animal welfare debate.

State Wild Dog Management Advisory Committee

- Provide policy advice and recommendations to the Agriculture Protection Board
- Review the overall performance of the Wild Dog Program within Western Australia as well as the performance of regional programs.
- Provide a forum for communication with industry and DCG/ZCA
- Seek the implementation of a National Wild Dog Strategy and ensure that all wild dog issues (policy and operational) are shared from state to state across the nation.
- Provide advice on the service delivery outcomes achieved.
- Reviewing of the strategy.

Appendix 3

(by Peter Thomson, Research Officer, Vertebrate Pest Research Section, Forrestfield. Extracted from Declared Animal Handbook)

DINGO / WILD DOG (*Canis* spp.)

Dingoes are probably descended from the Indian wolf, *Canis lupus pallipes* [5, 6]. They are usually classified as a subspecies of the domestic dog, *Canis familiaris*, with which they are able to interbreed and produce fertile offspring. However, given the wolf ancestry of both dingoes and domestic dogs, it has been suggested that scientific names of *Canis lupus dingo* and *Canis lupus familiaris*, respectively, would be more appropriate [6, 9].

'Wild dog' is a collective term used for dingoes, hybrids and feral domestic dogs. Most of the wild dogs from pastoral areas in Western Australia appear to be pure dingoes, though some hybrids are found near settlements and through the south-west. In practical terms, the general biology and behaviour of these canids (members of the dog family) is so similar that it is difficult to distinguish between them.

In this appendix, the text refers to dingoes where studies specifically dealt with essentially pure dingoes. Most of this information would apply equally to any wild dogs. In other sections, such as on control strategies and techniques, the text usually refers to the more generic term, wild dogs.

Identification

In body form and size, the dingo resembles a lean kelpie sheepdog, with erect ears and a bushy tail. Size and weight vary from place to place. For example, on the Nullarbor Plain in Western Australia, the average weights for dingoes older than 9 months were 15.9 kg (males) and 12.7 kg (females). At the Fortescue River, dingoes in that age group were larger and the respective weights were 17.5 and 14.4 kg [14]; weights of adults (>21 months) at the Fortescue River were 18.9 and 15.2 kg, respectively [27]. Dingoes typically have white points (feet and tail-tip). Their coats are generally ginger in colour, though black-and-tan and white individuals are found. Mixed colouration and brindling is commonly observed amongst hybrids [20].

Signs

Dog tracks are generally familiar to most people and are readily distinguishable from those of most other species. However, fox tracks can sometimes be confused with those of small dogs, particularly where the ground surface is not clear or soft. Nevertheless, there are differences which can help identify tracks of the two species. For example, the toe pads in foxes are generally more elongated, and the print tends to be proportionately longer in foxes. The prints of a fox trotting on soft ground tend to appear in a straight line, whereas those of dogs tend to be a little staggered.

Dog faeces (scats) are often deposited in conspicuous places (see section below on scent-marking), and provide clear evidence of the presence of wild dogs. Dog scats are bigger than those of foxes, tend not to contain much insect material, and unlike those of foxes, are generally not pointed at the ends.

Dingoes howl for communication (see below), and this can confirm their presence in an area.

Signs of damage to livestock are sometimes the first indication that wild dogs are active in an area. Identification of such damage is covered in the Damage and Damage Identification section.

Distribution and Population Density

It has been suggested that certain Asian dogs are sufficiently dingo-like to be termed dingoes [5]. These Asian dingoes are widely distributed throughout the mainland and islands of southern Asia.

Dingoes reached Australia about 3,500 - 4000 years ago, probably accompanying Asian seafarers rather than during an aboriginal migration [6]. They are now found in all Australian states except Tasmania. In Western Australia, they are rare or absent in most closely settled areas of the south-west. Hybrids are more common in the more settled areas of Australia.

In the absence of control by man, population densities of dingoes vary according to the distribution and abundance of food and water. In the Fortescue River area, during a period of apparently adequate food supply and in the general absence of control work, densities of up to slightly more than 20 dingoes per 100 km^2 were recorded (excluding pups) [31]. In more arid inland desert areas, overall population density is likely

to be considerably less than this.

Habitat

Dingoes have the ability to adapt to extreme heat and cold [23], enabling them to occupy a range of environments from semi-arid desert to sub-alpine regions. At a local scale, dingoes clearly prefer some habitats to others. For example, at the relatively hot, arid Fortescue River area, dingoes spend proportionately more time in riverine areas than in other parts of their range [30].

Food Habits

Hunting strategies of dingoes are flexible and range from individuals operating alone to capture small prey such as lizards to groups of dingoes co-operating to hunt large prey such as kangaroos or cattle. Their diet broadly reflects the type of prey available and the relative abundance of the various prey species. Nevertheless, dietary studies usually identify a relatively narrow range of prey species, indicating that dingoes are specialists rather than opportunistic generalists [9]. For example, although dingoes kill many sheep, they appear to prefer to eat other prey such as kangaroos [24, 29].

In the Fortescue area, dingoes prey predominantly on euros and red kangaroos, though cattle carrion and sheep are also eaten [29]. Less common species such as echidna and rock wallaby also appear as minor items in the diet. On the Nullarbor Plain, rabbits are the predominant dietary item even though kangaroos are present [15].

General Biology

Social Biology

Dingoes are social animals. In many areas, they are organised into discrete social groups consisting of a dominant male and female and their offspring of various years. These 'packs' maintain and defend distinct territories which only overlap to a minor extent with those of neighbouring packs [30]. The formation, size and stability of packs appear to be related to the size and abundance of the available prey species. In the Fortescue area, for example, dingoes co-operated in groups to hunt kangaroos and packs of up to 23 dingoes (including young-of-the-year) were found. In contrast, on the Nullarbor Plain, where rabbits were the principal prey, dingoes usually hunted alone and were more solitary [33]. Long-term, stable packs did not form and dingoes in the Nullarbor area did not appear to defend territories [14, 33].

It is rare to see all pack members together. Smaller sub-groups of 2-4 members of the pack or solitary dingoes are commonly seen [30]. Within packs, a dominance hierarchy (ranking order) exists and social status is usually indicated by dingoes avoiding conflict with others. Outright fighting is rare and aggression is apparently appeased by submissive postures. Pack cohesion and separation of adjacent packs is maintained by means of visual, vocal and scent communication. Howling appears to be of considerable importance, and enables individuals or sub-groups to find each other and congregate [7]. Howling is heard throughout the year but becomes more frequent prior to the breeding season [28].

Scent-marking involves defecation and urination, often at particular sites or 'scent-posts'. In canids, scent-marking appears to advertise the presence of individuals and may convey information on their identity, sex and reproductive status (see reference 9). Urination and ground-scratching increase in frequency over 2-3 months prior to the breeding season [28]. There is no evidence to suggest that scent-marks repel intruding dingoes.

Activity and Movement Patterns

Dingoes seldom travel during the heat of the day, especially in the summer months. Peak activity occurs at dawn and dusk with some activity during the night [28]. In more temperate areas, a greater incidence of day-time activity has been recorded [10].

Dingoes are essentially sedentary animals and do not undertake regular or seasonal migrations (migration refers to movement in a specific direction of a significant proportion of a population; dispersal is a different phenomenon and is outlined below). Movements are generally short and localised. At the Fortescue River, the average distance moved from one day to the next was about 3 km [30]. The home ranges of individual adult pack members averaged 56 km^2 for females and 85 km^2 for males [30]. Group home ranges (or pack

territories) ranged from about 45 to 110 km^2 in area [30]. On the Nullarbor, dingoes roamed over larger areas of up to 300 km^2 [33]. Within their home ranges, dingoes concentrate their activities around favoured areas such as gorges and river pools, where food, water and shelter are readily available. The movement patterns of dingoes appear to be similar from season to season, except when breeding females are confined to dens during the whelping and early nursing period [30].

Individuals occasionally disperse from their home range but long distance dispersal moves are rare. During the Fortescue study, only one third of the dingoes which dispersed travelled more than 20 km from their original range; the only move in excess of 50 km was made by a mature male which moved 184 km [32]. On the Nullarbor, less than 10% of dingoes moved in excess of 50 km, though it is not certain that these were all dispersal moves [33]. There was, however, one exceptionally long move of 215 km in 4 months.

Reproduction

Female dingoes have a single breeding season each year. Oestrus occurs between March and June and whelping between June and August. In the Fortescue River area, the average whelping date was 18 July [28]. Evidence of a reproductive cycle in males has been found, with few viable sperm being produced in summer [4]. Hybrid animals tend to have a less distinctive seasonality to the reproductive cycle, and the pulse of whelping evident with dingoes is disrupted when a large proportion of hybrids and / or feral dogs are present [9, 11].

The gestation period of 63 days for dingoes is the same as that of domestic dogs. Bitches seek caves, rock piles, hollow logs, enlarged rabbit burrows or similar sheltered sites in which to whelp. Dens are often in elevated positions, usually close to water [28]. Litters average five pups [31], which are weaned from about two months of age.

Some young dingoes become sexually mature at 9-12 months of age [31]. However, the breeding success of young dingoes is likely to be lower than that for older dingoes. Breeding success may be affected by social circumstances (dominance status in a pack, presence of potential companions to help obtain food), as well as food supply (type of prey available, and abundance) (see reference 31).

After whelping occurs, other members of the pack or social unit feed the pups when they begin to eat meat and probably provide for the bitch during early lactation. After the den is abandoned (4-9 weeks, average 8 weeks) the pups are moved to a succession of sites to which food is brought by the adults [28]. By 9-24 weeks of age, the pups accompany adults on forays that become progressively longer, sometimes to the sites of kills [28]. At this stage, the litter may be split up amongst several adults of the pack. In the Fortescue area, pups remained with the pack. In some other areas of Australia, pups appear to become largely independent of the adults by the age of 4-6 months.

Damage and Damage Identification

Dingoes usually catch large prey from behind as the pursued animal is running away. When prey such as kangaroos have been brought to a stop, dingoes transfer their attack from the hind end to the throat. Death usually results from suffocation and shock, rather than blood loss. Mutilation often results from attacks by inexperienced dingoes and by dingoes attacking prey for reasons other than for food. The latter situation is common when sheep are involved (see reference 24). Injured or mutilated sheep are often found in paddocks where dingoes are active.

Animals killed by dingoes usually have clear puncture wounds at the throat. There may also be evidence of bites and bruising to the legs, particularly the hind legs. Verification of predation often requires skinning of at least the throat and legs. It may also require an examination of signs of the struggle near the carcass. The procedures used in identifying dingo predation on sheep are given in Farmnote 'Recognising wild dog and dingo predation', (see Further Reading). These general procedures can be applied to other prey such as calves.

Economics of Damage and Control

In Western Australia, sheep comprise the bulk of the stock losses attributable to wild dogs, including dingoes. Research carried out at the Fortescue River [24] showed that:

i) Most dingoes in sheep paddocks attacked sheep.

ii) Dingoes often maimed sheep without killing them.

iii) Dingoes sometimes chased sheep without biting them. Harassment by dingoes can lead to problems such as increased mis-mothering of lambs.

iv) Even when not actively harassing sheep, the presence of a dingo in the area could have an adverse influence on sheep distribution and behaviour.

Sheep Losses

The extent of these losses is very difficult to measure, particularly under the extensive rangeland grazing conditions in Western Australia. However, some examples of potential losses caused by dingoes were obtained from the Fortescue study. In one instance, losses of 33% would have been expected if dingoes had killed sheep at the recorded rate over the full year. In another, an annual loss of 16% was calculated. Losses of these levels far outweighed the costs of a subsequent aerial baiting campaign that effectively protected the sheep flock from further predation. Benefit-cost analyses on a statewide basis are difficult to carry out because losses of stock (i.e. the costs of predation) in the absence of control work can only be estimated. One benefit-cost analysis calculated that WA's wild dog control program is economically justified if predation on sheep is greater than 5% [22]. Data from the Fortescue study suggest that this would be likely.

Cattle Losses

In contrast to the case with sheep, the impact of wild dog predation on cattle is more variable [9], and not as well documented. Observations at the Fortescue showed that dingoes could efficiently prey on calves. However, the incidence of attacks on cattle was very low, particularly when alternative, natural prey (kangaroos) was available. Dingoes were implicated in significant losses of young calves in a northern Queensland study [21]. More recent work in Queensland has further demonstrated that losses of up to 30% of calves can be attributed to predation, though average predation losses would normally be in the order of 0-10% [1]. Factors such as the abundance and type of natural prey, and even the breed of cattle (influencing mothering behaviour and defence against wild dogs), appear to be important determinants of the incidence of calf losses to predation.

The overall economic significance of dingo predation to the pastoral cattle industry is unknown. It seems likely that for an individual station, the potential benefits gained by saving even a few calves from predation would outweigh the costs of a baiting campaign.

Environmental Considerations

The role played by dingoes in the wider ecosystem must also be recognised. Dingoes at the Fortescue preyed disproportionately on certain classes of kangaroo and appeared to be responsible for the decline of a local population of euros [29]. Work in eastern Australia has also indicated that dingoes can control populations of kangaroos (see reference 9). In some cattle grazing areas, dingo predation on kangaroos or wallabies may be advantageous to the industry. The removal or control of dingoes in areas where they pose no threat to livestock is not only economically unsound but also threatens ecological balances.

Declaration Status

Dingoes are declared pests of agriculture in Western Australia under the provisions of the *Agriculture and Related Resources Protection Act 1976* in category A7. This means that as animals native to WA, dingoes should, in the opinion of the Agriculture Protection Board, have a program for their management approved, published and implemented. Such management plans are drawn up in consultation with the Department of Conservation and Land Management (CALM) as this department administers the *Wildlife Conservation Act 1950*, under which dingoes are listed as 'unprotected fauna'. In practice, dingo control is allowed in pastoral areas and adjacent 'buffer zones'; control programs in fauna reserves and National Parks are subject to specific local agreements between the relevant Departments and landholders.

Dingo hybrids and other wild dogs are declared pests under the *Agriculture and Related Resources Protection Act 1976* in category A5. This means that populations must be controlled. In practice, as is the case for

dingoes, control work is directed at areas where wild dogs are posing a risk to livestock.

Issues relating to the management of dingoes in captivity should be directed to CALM, as the keeping of native animals is dealt with under the *Wildlife Conservation Act 1950*. Issues relating to the management of captive dogs should be directed to the Local Shire, as the keeping of dogs is covered under the *Dog Act (1976)*.

General Strategy for Damage Prevention

The aim of controlling dingoes and other wild dogs is to protect livestock from attacks and harassment. The approach used to control dingoes in sheep grazing areas is different from that in cattle areas. Sheep and dingoes cannot co-exist [24] and so a control strategy aimed at keeping sheep paddocks free of dingoes must be adopted. In the absence of fences to exclude them (see later), dingoes must be controlled *before* they reach the sheep paddocks [30, 32].

Buffer Zone Concept

Studies in Western Australia and the eastern states [10, 18, 32] have demonstrated that only those dingoes living within or close to stocked paddocks are likely to pose a threat to livestock. Control work should concentrate on removing these dingoes and creating a 'dispersal sink' or 'buffer zone' free of dingoes adjacent to the stocked areas [32]. Dingoes that disperse from their home ranges continue to move until they find suitable resources (food, water) in an area where they are not subject to harassment by territorial, resident dingoes. Where a dingo-free buffer zone is present, dingoes which have dispersed from beyond the zone are likely to settle before they reach the sheep paddocks [25]. Ongoing control effort in the zone normally removes these immigrants before they have an opportunity to establish their own area and social group.

Buffer Zone Size and Level of Control

To ensure that adequate resources are available to immigrating dingoes, a buffer zone equivalent to the width of one to two territories is recommended. In the Fortescue area, this amounts to about 15 - 20 km [30, 32]. The abundance and distribution of water is an obvious factor that must be taken into account in devising a suitable buffer zone. Widely-spaced waters necessitate a wider zone than that appropriate for the Fortescue area (for example, up to 35 km on the Nullarbor).

The degree to which the buffer zone must be kept clear of dingoes depends on the nature of the social system of local dingoes. In areas where dingoes display strong territoriality, such as in the Fortescue, the buffer zone must be kept as clear as possible, as any surviving resident pairs could effectively prevent the settling of dispersing dingoes. These may then move onto stocked areas. In contrast, in the Nullarbor area, dingo groups share limited watering points and are less territorial. In this area, a general reduction of the dingo population in a buffer zone should ensure that immigrating dingoes could settle in the buffer, rather than continuing to move, possibly through into stocked paddocks [33].

Concentrating the control effort into defined areas is more efficient than a less intensive, haphazard effort over a wide, unlimited area [25]. The general philosophy of restricting dingo control work to within and close to paddocks also applies to the cattle industry. However, eradication of dingoes in these areas is not an economically sound goal. Research in the Fortescue area showed that only some social units of dingoes were involved in attacks on cattle. Furthermore, co-operation between dingoes appeared to be necessary to ensure a successful attack. This suggests that a general reduction in the number of dingoes in problem areas should be sufficient for the protection of cattle herds. More effort than this would be considerably more expensive, and is not required to achieve protection from predation.

Coordinating the Control Effort

A study in Queensland reported that controlling dingoes over a relatively small area actually led to an increase in predation on calves [1]. It seems that rapid immigration of younger or lone dingoes occurred. These dingoes would have been less successful than stable packs of dingoes at hunting the macropod prey of the area, pre-disposing them to attack vulnerable, new-born calves [2]. This outcome suggests that the co-ordination of baiting between properties (as is general practice), producing a more general population reduction rather than over one small area, is a sound strategy.

Choosing Control Methods

Baiting is normally the primary control method because of its cost-effectiveness. Trapping is sometimes needed to remove wild dogs which do not take baits, or in areas where baiting is not possible. Clearly, no single control technique is appropriate for every situation. In designing a control campaign, it is necessary to take account of:

- the extent of the problem (for example, is damage restricted to a specific site, or is it widespread?),
- the history of control work in the area (for example, has the area been repeatedly baited?),
- the environmental conditions (for example, is there abundant prey available to wild dogs?), and
- the time of year (for example, is it the period when wild dog movements will be restricted because young pups are present?; is rain likely to disrupt control plans?).

Baiting

Baiting is the most cost-effective lethal technique available to control wild dogs (see reference 26), and the only practical means for achieving population control in many inaccessible and remote areas [9].

1080

1080 is now the only poison registered for use in baits for wild dogs in WA, and strict regulations govern its use. Trained landholders can purchase bait products containing 1080 after they have obtained Baiting Approval from an authorised officer of the Department of Agriculture. Farmnote 'Guide to the safe use of 1080 poison' (see Further Reading) details important precautions. Strychnine can now only be used to poison the jaws of traps (see section on trapping, below).

1080 has many advantages over other toxins such as strychnine. Relative to many native species, canids such as dogs and foxes are particularly sensitive to 1080 [17, 12]. This makes baiting with 1080 more target-specific than with other types of poison. In addition, the water solubility of 1080 means that the toxin is eventually leached out of remaining baits by rain, reducing any lasting hazard posed by uneaten baits. 1080 is also broken down by micro-organisms [36], eliminating any long-term environmental contamination.

Bait Characteristics and Production

Most baits used for wild dog control in WA are prepared from kangaroo meat. These baits are prepared from cubes of meat (110 g fresh weight, each injected with 0.2 ml of 30 mg/ml 1080 solution), which are then sun-dried on racks to lose about 60% of their weight in moisture. Trials have shown that dogs readily eat the dry meat [34]. Dried meat baits have several advantages over undried baits. Dried meat is more difficult than moist meat for small native carnivores and other species to eat [3, 16], and the baiting is therefore more target-specific. As well, dried meat lasts physically longer, and the baits are more resistant than moist baits to the rapid loss of 1080 which can occur through insect attack or exposure to rainfall (for example, see reference 19; c.f. dried meat in reference 13). Rapid loss of 1080 is undesirable because baits may become sub-lethal while still available to wild dogs. This could result in individuals becoming bait-shy, and in the much longer term, might even select for genetic resistance to 1080 in wild dogs.

Bait Longevity

Research has shown that dried meat baits killed radio-collared dingoes up to 7 weeks after baits were laid [26]. Although generally advantageous, the extended longevity of dry baits in the absence of rain (see reference 35) must be considered when assessing the potential risks to non-target animals, particularly domestic dogs.

Ground Baiting

Ground baiting is generally used in more accessible areas where wild dog activity has been identified (for example, wild dogs drinking at a particular waterhole or using a particular track). If non-target animals such as birds are at risk, baits can be buried or hidden (for example, amongst leaves or bushes). A lure, such as a decomposing carcass, can be used to attract wild dogs into an area where baits have been placed.

Aerial Baiting

Baits distributed from the air are laid at watering points and along identifiable routes used by wild dogs (for example, vehicle tracks, major pads, watercourses, gorges). Random and widespread distribution of baits is inefficient and increases the chance of non-target animals consuming the bait. Even on the Nullarbor Plain, where there are few geographical features to channel or concentrate the activities of wild dogs, effective results can be obtained by concentrating the baiting to the sparse and easily identified watering points [33].

There has been a move away from the larger, twin-engined aircraft formerly used in aerial baiting campaigns. Although these aircraft often have long-range capability and carry a large payload, they are expensive to operate and are less manoeuvrable than smaller aircraft. In addition, the move towards more strategic baiting has meant that navigators with a sound knowledge of specific areas are used (usually station owners or doggers). This means that the aircraft land more frequently, picking up personnel and baits as required, removing the need for extended range and carrying capacity. Fixed wing aircraft such as the Cessna 206 are generally used, and fly at a height of about 100 m, depending on terrain. Aircraft are fitted with hoppers and bait chutes, and a person is directed by the navigator as to when and how many baits should be dropped. The path followed by the baiting aircraft is automatically logged into an on-board GPS, so that accurate records are kept of baiting operations. Sensors are incorporated into the bait chute and the data linked to the GPS so that the location and number of baits are logged simultaneously. This allows campaigns to be readily reviewed and aids future planning.

Rate of Bait Lay

Unlike the situation with baiting for foxes, there are no specific recommended rates of bait-lay for wild dogs. Rates are determined by local experience, though it is likely that rates could be reduced with no detrimental impact on baiting success. Clearly, the use of fewer baits saves costs, and reduces any potential non-target risks associated with the baiting.

Timing of Baiting

The issue of when and how often to carry out baiting campaigns is a complex one, and depends on a number of factors (and see reference 9). In addition to economic factors, the availability of natural food for the target animals, and the season (weather, availability and distribution of water, stage of the breeding cycle) can play a role.

Traditionally, baiting campaigns in Western Australia have been carried out in autumn (late April/May) and spring (September/October) [26]. The autumn timing was to coincide with the breeding activity, when mating is taking place, and bitches are in early pregnancy. The spring timing was to coincide with the stage when pups begin to move about, removing the restrictions on movements associated with denning [30] and increasing the likelihood of animals encountering baits. Food demands are also likely to be high at this time, and in the more arid areas, surface water becomes more restricted, making it easier to target the limited number of waterholes with baits.

This approach is still followed, though baiting is often now only done in spring. Baiting earlier in the year is sometimes abandoned due to cost considerations and the possibility of rain leaching out 1080 (see above). In some areas, the 'spring' baiting is being aimed for even later in the year, when the availability of water is even more restricted.

Aerial baiting for wild dogs is usually repeated on an annual cycle. There may be occasions when baiting in buffer zones could be missed in some years without jeopardising livestock protection [30]. However, this could be a risky undertaking unless very detailed information was available on how many wild dogs were in an area, how many were breeding, and on the abundance of the food supply. Otherwise, the safest 'insurance' action is simply to bait the known problem areas on an annual basis.

Trapping

Trapping is labour intensive and therefore expensive, and hence is inappropriate to use for general population control. However, it can be effective in dealing with individual, problem wild dogs. It is normally used where baiting has proven to be less effective, for example in sheep paddocks where dogs are less likely to take

baits because of abundant food [9].

Trapping must be carried out carefully to minimise suffering to captured animals and to minimise the risk of catching non-target animals. Humane, successful use of traps requires training and experience. Incorrect setting and placement can result in some wild dogs becoming trap-shy, making them very difficult to trap. Careful selection of trap sites also reduces the chances of catching non-target animals. In Western Australia, traps are poisoned with strychnine to ensure that trapped wild dogs die quickly (see Farmnote 'Guide to the safe use of strychnine for jawed traps', see Further Reading).

The 'Lane' steel leghold trap is the most widely used trap for wild dog control in WA. Increasing concern over animal welfare issues surrounding the use of steel-jawed traps [8] has led to them being banned in some states. This has resulted in a move towards traps that have some form of rubber-like padding on the jaws [9]. Lanes traps can be modified in this way, with no detrimental impact on efficacy. The padding reduces the likelihood of serious injury to the trapped animal [8]. The use of strychnine on the jaws of traps in WA largely removes the risk of long-term suffering by a trapped dog. Nevertheless, it is possible that in the future, the banning of bare-jawed traps will extend nation-wide. Apart from requiring modifications to existing traps, this would have no practical impact on the use of traps for wild dog control in WA.

Shooting

Wild dogs are seldom seen during the day and in areas subject to control work, they are especially wary of man. Shooting is therefore regarded only as an opportunistic method of dingo control. Appropriate high-power firearms should be used to ensure accuracy and sufficient energy to effect a humane kill over the type of distances often involved.

Exclusion Fencing

Exclusion fencing provides a non-lethal means of protecting livestock from predators. Where conditions are suitable, and fences are properly maintained, wild dogs can be excluded by either netting or high-voltage electric fences [9]. Fencing is worthwhile only when wild dogs can be totally removed from the properties requiring protection. In Western Australia, large-scale exclusion fencing against wild dogs is impractical. Not only is there an uneven mosaic of problem (dingo-prone) and non-problem areas, but also much of the terrain involved (watercourses, breakaways etc.) would make the construction and particularly the maintenance of exclusion fences very difficult.

Netting fences have been used in the eastern states for many decades and generally act as a barrier along the extensive and distinct boundaries between sheep grazing areas and cattle country/crown land. Several properties on the Nullarbor have boundary fences of dingo-proof netting. These fences are effective but very expensive to construct and maintain. Electric fences are cheaper than netting fences.

Electric fences have been developed to exclude a variety of vertebrate pests, including wild dogs. Some make use of an existing fence and incorporate one or two electrified wires on outriggers; others are constructed as plain wire fences with six or seven alternating live and earth wires. Reducing the wire spacing and increasing the number of wires increases the effectiveness of electric fences, but also increases their cost [9]. A good summary of fence designs and costs from eastern Australian studies can be found in reference 9.

Even well-maintained fences are sometimes crossed by wild dogs. Occasional mopping-up measures using standard control techniques must therefore be employed. In most fenced areas, some form of buffer zone control is carried out to relieve potential pressure on the fences.

Biological Control

It is unlikely that deliberate biological control of wild dogs would be successful. Dog diseases such as distemper and mange are already present in the wild, meaning that attempts to re-introduce them to some areas would have little or no impact. New or genetically-modified diseases offer little hope because domestic dogs would be equally susceptible, and public concern would almost certainly preclude their introduction or use. As well, the conservation status of dingoes would have to be considered in any attempt to introduce any new and naturally-spreading lethal agent.

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Further Reading

Copies of the following publications are available from your local Department of Agriculture office or at: www.agric.wa.gov.au Type the title required in the 'Search' facility and click 'go'.

- Wild dog control.
- Wild dog control: Facts behind the strategies.
- Recognising wild dog and dingo predation.
- Bounties and wild dog control.
- Dingo.
- Guide to the safe use of 1080 poison.
- Guide to the safe use of strychnine for jawed traps.

Appendix 4 - Statutory framework for wild dog control

1. State legislation

Agriculture and Related Resources Protection Act 1976

ss. 35–37 APB can declare species for part or whole of State into management categories.

ss. 39–41 Government department to control pests on its lands (no penalty, but may be advised by inspector or authorised officer, may enter into agreement with Agriculture Protection Board).

ss. 42–46 Local government to control pests on its lands. Penalties for non-compliance, notices may be issued, costs recovered.

ss. 49–53 Private landholders to control pests on their lands. Penalties for non-compliance, notices may be issued, costs recovered.

ss. 69 Authority to use poisons and set traps by authorised person where landholder is notified.

ss. 77–78 Prohibition on introduction without permit.

ss. 80–81 Prohibition on keeping without permit.

Animal Welfare Act 2002 (AWA)

Part 3 – Offences against animals.

s.19 (1) A person must not be cruel to an animal.
Penalty:minimum-$2000
Maximum-$50000 and imprisonment for 5 years.

s.19 (2) Without limiting subsection (1) a person, whether or not the person is a person in charge of an animal, is cruel to an animal if the person –

(a) tortures, mutilates, maliciously beats or wounds, abuses, torments or otherwise ill-treats, the animal:

(b) uses a prescribed inhumane device on the animal;

(c) intentionally or recklessly poisons the animal;

(d) does any prescribed act to, or in relation to, the animal; or,

(e) in any other way causes the animal unnecessary harm.

s.19 (3) Without limiting subsection (1) a person in charge of an animal is cruel to an animal if the animal;

(a) is transported in a way that causes, or is likely to cause, it unnecessary harm;

(b) is confined, restrained or caught in a manner that-

(i) is prescribed; or

(ii) causes, or is likely to cause, it unnecessary harm;

(c) is worked, driven, ridden or otherwise used-

(i) when it is not fit to be so used or has been over used; or

(ii) in a manner that causes, or is likely to cause, it unnecessary harm;

(d) is not provided with proper and sufficient food or water;

(e) is not provided with such shelter, shade or other proptection from the elements a sis

reasonably necessary to ensure its welfare, safety and health;

(f) is abandoned, whether at the place where it is normally kept or elsewhere;

(g) is subjected to a prescribed surgical or similar operation, practice or activity;

(h) suffers harm which could be alleviated by the taking of reasonable steps;

(i) suffers harm as a result of a prescribed act being carried out on, or in relation to, it; or

(j) is, in any other way, caused unnecessary harm.

Note-person in charge is defined in the Act as (a) the owner of the animal;(b) a person who has actual physical custody or control of the animal; if the person referred to in (b) is a member of staff of another person, that other person; or(d) the owner or occupier of the place or vehicle where the animal is or was at the relevant time;

Staff under the Act includes (a) all the people working for, or engaged by, that person whether as officers, employees, agents, contractors, volunteers or in any other capacity; (b) if the person is a scientific establishment, all people who use the establishment's facilities for scientific purposes; (c) if the person is a body corporate, its directors, secretary and executive officers; and (d) if the person is a partnership, the partners.

There are a number of defences under the Act (refer Act for details if not given below):

s.20 Defence-self-defence or protecting another person or an animal

s.21 Defence-veterinary care

s.22 Defence-authorised by law

s.23 Defence-normal animal husbandry

s.24 Defence-killing pests

(1) It is a defence to a charge under section 19 (1) for a person to prove-

(a) that the act alleged to constitute the offence was done while the person was attempting to kill pests;

(b) that the person was attempting to kill pests in a manner that is generally accepted as usual and reasonable for killing pests of the kind the person was attempting to kill; and

(c) if the animal the subject of the charge was not a pest, that the person took reasonable steps to ensure that animals other than pests would not be harmed.

(2) In this section-

"pest" means a prescribed animal, fish or invertebrate.

See Animal Welfare(General) Regulations 5: prescribed "pest"-an animal *set out* in the list of declared animals published under section 35 of ARRPA 1976 if

(a) the animal is not being kept as a domestic pet;

(b) the animal is not being kept for the purposes of racing, riding or harnessing;

(c) the animal is not being kept for the purpose of confined display or entertainment;

(d) the animal is not being kept as a form of livestock; and

(e) at the time a person attempts to kill the animal , it is not under effective control of an owner.

s.25 Defence-code of practice

s.26 **Defence-stock fending for itself**

s.27 **Defence-releasing animals into the wild**

s.28 **Defence-where person in charge is not in actual custody**

s. 29 **Defence-prescribedd use of devices**

It is a defence to a charge under section 19(1) committed in circumstances described in section 19(2) b for a person to prove that the person was a prescribed person, or was in a prescribed class of persons, and used the device in a prescribed manner.

Animal Welfare (General) Regulations 2003

s. 8 **Prescribed manner of use for "devices" - metal-jawed traps**

s. 8(1) For the purposes of section 29 of the Act, it is a defence to a charge under section 19(1) of the Act, committed in circumstances described in section 19(2) of the Act, if a metal-jawed leghold trap is used by -

(a) the owner or leasee of an agricultural or pastoral property, or their authorised agent; or

(b) an officer of a Commonwealth, State or local government agency, who is responsible for wild dog control,

for the purpose of wild dog control.

s. 8(2) The person using a metal-jawed leghold trap in circumstances described in subregulation (1) must ensure that the jaws of the trap are bound with cloth containing sufficient strychnine to ensure a rapid death for any animal likely to be caught in the trap.

s. 8(3) For the purposes of section 29 of the Act, it is a defence to a charge under section 19(1) of the Act, committed in circumstances described in section 19(2) b of the Act, if a metal-jawed leghold trap is used by a person participating in a research program, approved by an animal ethics committee, for the purpose of carrying out research under that program.

s. 8(4) The person using a metal-jawed leg hold trap in circumstances described in sub-regulation (3) must ensure that the jaws of the trap are sufficiently padded, or the trap has otherwise been modified, so that any animal caught in the trap is unlikely to suffer significant injury.

s. 8(5) For the purposes of section 29 of the Act, it is a defence to a charge undersection 19(1) of the Act, committed in circumstances described in section 19(2)(b) of the Act, if a metal-jawed leg hold trap is used by -

(a) the owner of land or the owner's agent on the relevant land; or

(b) a licensed pest control operator,

for the purpose of fox control.

s. 8(6) The person using a metal-jawed leg hold trap in circumstances described in sub-regulation (5) must ensure that -

(a) the jaws of the trap are sufficiently padded, or the trap has otherwise been modified, so that any animal caught in the trap is unlikely to suffer significant injury; and

(b) if the trap is to be used in the metropolitan area, any permit required under the *Agriculture and Related Resources Protection (Traps) Regulations 1982* has first been obtained.

s. 30 **Defence-prescribed surgical or similar operations, practices and activities**

Note-r.3 of the Animal Welfare (General) Regulations 2003 lists jawed traps as a prescribed inhumane device.

Dog Act 1976

s. 29 **Power to seize, detain and/or destroy stray dogs**

s. 33A **Control of dogs in places that are not public**

s. 33D(1) If a dog attacks or chases any person, or any animal owned by or in the charge of another person, whether or not any injury is caused, every person liable for the control of the dog commits an offence

s. 34 Provides for the protection of livestock by destroying dogs:

(1) where they are involved in attacks on livestock where there is no other way of stopping them or

(2) where they are unaccompanied in an enclosed paddock or other place where livestock are kept or by

(3) using poison, under certain conditions, on occupied land where livestock are kept.

Poison Act 1964

s. 24(5) Notice to impose such conditions and restrictions on the sale, supply, use and possession of any poison included in Schedule 7 (1080, strychnine).

Poisons (Section 24) (Registered Pesticide 1080) Notice 2000

s. 3 Conditions imposed on sale, supply, use and possession of 1080, and exemptions

s. 4 General conditions relating to sale and supply of 1080

s. 5 General conditions relating to use and possession of 1080

s. 6 Condition relating to use of 1080 that is to be mixed and prepared before use

s. 7 Conditions relating to use of 1080 on land

Poisons (Section 24) (Registered Pesticide Strychnine Alkaloid) Notice 2001

s. 3 Conditions imposed on sale, supply, use and possession of strychnine, and exemptions

s. 4 General conditions relating to sale and supply of strychnine

s. 5 General conditions relating to use and possession of strychnine

s. 6 Condition relating to use of strychnine that is to be mixed and prepared before use

s. 7 Conditions relating to use of strychnine on land

Wildlife Conservation Act 1950

s. 6—'fauna': …means

(a) any animal indigenous to any State or Territory of the Commonwealth or the territorial waters of the Commonwealth;

(b) any animal that periodically migrates to and lives in any State or Territory of the Commonwealth or the territorial waters of the Commonwealth; and

(c) any animal declared as fauna

and includes in relation to any such animal -

(d) any class or individual member thereof;

(e) the eggs, larvae or semen;

(f) the carcass, skin, plumage or fur thereof,

but does not include any prescribed animal or prescribed class of animal; wildlife that was not originally introduced to Australia by human intervention (other than wildlife introduced before the year 1600…

s. 14 Declaration of fauna as protected.

s. 16 Taking and possession of protected fauna offences

Wildlife Conservation Regulation 1970

s. 28 A person shall not keep any fauna in captivity or confinement except under the authority of a licence issued.

s. 42 (2)

(a) A person shall not take any fauna, whether protected or not protected, on any nature reserve unless authorized to do so by the Executive Director of CALM.

(b) The Executive Director may not give such authority except —

(i) in accordance with the *Wildlife Conservation Act 1950* and these regulations; or

(iii) in the case of an animal declared to be a declared animal under the *Agriculture and Related Resources Protection Act 1976*, he may issue the appropriate licence for its destruction subject to such conditions as he thinks fit.

s. 54(1)—

(b) A firearm, weapon or instrument is not an illegal device when used to take fauna if its use is authorized by —

(i) a licence issued under the Act or these regulations;

s. 54(7) The following devices are not illegal devices if used in the following manner—

(a) Traps or similar devices, if used to take fauna declared to be not protected by notice published under section 14 of the Act;

(b) A net, snare or trap when being lawfully used under another written law, which results in the accidental taking of fauna.

s. 54(11) The use of an explosive, poisonous, noxious or narcotizing substance is not an illegal means of taking fauna if—

(a) The fauna taken by this means has been declared to be not protected by notice published under section 14 of the Act;

(b) Its use is authorized by a notice published under section 14 of the Act; or

(c) Used to take fauna under a licence issued under the Act or these regulations, if that licence permits the use of that substance.

2. Federal Legislation

***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**

This Act applies when the activity is likely to have a significant impact on a matter of national environmental significance. It aims to promote the conservation of biodiversity and it includes provisions to deal with invasive species.

Land listed on the Commonwealth Register of the National Estate is managed under provisions in the *Australian Heritage Commission Act 1975* (AHC Act). Listing under Criteria A and B of the AHC Act requires that any activities that may impact on the biodiversity of the area have to be formally considered under section 30 of the Act; however, baiting of nuisance and feral animals is not precluded. Baiting can be viewed as a routine maintenance operation aimed at enhancing biodiversity by reducing non-native predator pressure on indigenous wildlife populations.

Civil Aviation Regulations 1988

Govern the aerial application of 1080 baits.

This document was prepared by the State Wild Dog Management Advisory Committee

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