Our ref: eA197931
Obj ID: A5577665

Government of South Australia
The Hon Clare Scriven MLC

Hon Nicola Centofanti MLC
Member of the Legislative Council
Parliament House
ADELAIDE SA 5000

Dear Ms Centofanti

Determination under the *Freedom of Information Act 1991*

I refer to your application made under the *Freedom of Information Act 1991* (the Act) received by the Office of the Minister for Primary Industries and Regional Development on 19 August 2022 requesting access to the following:

> *"A copy of all documents (including but not limited to hard copy or electronic briefings, minutes, reports, emails, letters, meeting agendas, diary entries, event attendance records and any other correspondence) between Department of Primary Industries and Regions South Australia and the Minister for Primary Industries and Regional Development (including directly with staff within the office of the Minister for Primary Industries), relating to feral pigs, goats and deer?"*
>
> Timeframe: 19/03/2022 to 19/08/2022

Accordingly, the following determination has been finalised.

I have located twenty documents that are captured within the scope of your request.

Determination 1

I have determined that access to the following documents is **granted in full**:

Doc No.	Description of document	No. of Pages
7	Minute from Chief Executive, Department of Primary Industries and Regions to Minister for Primary Industries and Regional Development dated 12/4/2022 re feral deer management in South Australia	5
7a	Attachment to Document 7 – Feral Deer Control Economic Analysis dated 1/4/2022	72

Minister for Primary Industries and Regional Development
Minister for Forest Industries

GPO Box 1671 Adelaide SA 5001
Telephone 08 8226 2931 | Email minister.scriven@sa.gov.au

SOUTH AUSTRALIA

15	Minute from Chief Executive, Department of Primary Industries and Regions to Minister for Primary Industries and Regional Development dated 12/4/2022 re feral deer management in South Australia – Noted by Minister	5
16	Departmental Workflow Request dated 19/4/2022 re Feral deer management program	1

Determination 2

I have determined that access to the following documents is **granted in part**:

Doc No.	Description of document	No. of Pages
3	Minute from Chief Executive, Department of Primary Industries and Regions to Minister for Primary Industries and Regional Development dated 22/4/2022 re Centre for Invasive Species Solutions	3
4	Minute from Chief Executive, Department of Primary Industries and Regions to Minister for Primary Industries and Regional Development dated 22/4/2022 re Centre for Invasive Species Solutions – Noted by Minister	3

The information removed from the above documents is pursuant to Clause 5(1)(a)(i) and Clause 9(1) of Schedule 1 of the Freedom of Information Act.

Clause 5(1)(a)(i) states:

> ***"5—Documents affecting inter-governmental or local government relations***
> *(1) A document is an exempt document if it contains matter—*
> *(a) the disclosure of which -*
> *(i) could reasonably be expected to cause damage to intergovernmental relations; and*
> *(b) the disclosure of which would, on balance, be contrary to the public interest."*

The information removed pursuant to Clause 5(1)(a)(i) consists of detail relating to Commonwealth Government funding.

In addressing the public interest test for the Clause 5 exemption, I have balanced the following factors:

In favour of the public interest:

- Meeting the objects of the Act favouring access to documents.
- Ensuring optimal use of public resources.
- High level of interest in the accountability of public office holders.
- The importance of transparency and openness and the interest that the public has in the decision-making processes of Government.

Contrary to the public interest:

- The need to preserve confidentiality of information being shared between government agencies
- The recent age of the information was considered and the continuing relevance of the matters.
- To release this information prematurely would harm inter-governmental relationships with the Commonwealth Government resulting in agencies reconsidering their position regarding their future interactions with the South Australia Government.

Clause 9(1) states:

> ***"9—Internal working documents***
> *(1) A document is an exempt document if it contains matter—*
> *(a) that relates to -*
> *(i) any opinion, advice or recommendation that has been obtained, prepared or recorded; or*
> *(ii) any consultation or deliberation that has taken place, in the course of, or for the purpose of, the decision-making functions of the Government, a Minister or an agency; and*
> *(b) the disclosure of which would, on balance, be contrary to the public interest."*

The information removed pursuant to Clause 9(1) consists of agency funding matters for decision-making purposes.

In addressing the public interest test for the exemption, I have balanced the following factors:

In favour of the public interest:

- Meeting the objects of the Act favouring access to documents.
- Ensuring optimal use of public resources.
- High level of interest in the accountability of public office holders.
- The importance of transparency and openness and the interest that the public has in the decision-making processes of Government.

Contrary to the public interest:

- The need to preserve confidentiality of some funding matters for the provision of internal advice.
- If documents of this nature were disclosed, PIRSA officers may be more hesitant when recording information which, in turn, may result in less effective and accurate detail being captured for the decision-making purposes of Government.
- Disclosing this information may compromise the manner in which information is gathered in the future for the decision-making processes of Government to the detriment of the betterment for South Australia.

Having considered the various factors weighing for and against disclosure for the Clause 5 and Clause 9 exemptions, I have determined that disclosure of this information would, on balance, be contrary to the public interest.

The remaining information removed is outside of the scope of your request.

Determination 3

I have determined that access to the following documents is **granted in part**:

Doc No.	Description of document	No. of Pages
1	Departmental Workflow Request dated 3/6/2022 re Feral Deer in the South East	1
8	Departmental Workflow Request dated 15/6/2022 re Feral Deer on Fleurieu Peninsula	1
9	Minute from Chief Executive, Department of Primary Industries and Regions to Minister for Primary Industries and Regional Development dated 28/6/2022 re Management of Feral Deer on Fleurieu Peninsula	5
10	Departmental Workflow Request dated 27/4/2022 re Feral Deer Management – Fleurieu Peninsula	1
11	Minute from Chief Executive, Department of Primary Industries and Regions to Minister for Primary Industries and Regional Development dated 10/5/2022 re Feral Deer on Fleurieu Peninsula	4
12	Minute from Chief Executive, Department of Primary Industries and Regions to Minister for Primary Industries and Regional Development dated 10/5/2022 re Feral Deer on Fleurieu Peninsula	3
14	Departmental Workflow Request dated 16/8/2022 re Feral Deer	1
17	Minute from Chief Executive, Department of Primary Industries and Regions to Minister for Primary Industries and Regional Development dated 26/4/2022 re feral deer	6
18	Minute from Chief Executive, Department of Primary Industries and Regions to Minister for Primary Industries and Regional Development dated 26/4/2022 re feral deer – Noted by Minister	5

The information removed from the above documents is pursuant to Clause 6(1) of Schedule 1 of the Freedom of Information Act which states:

> ***"6 - Documents affecting personal affairs***
> *(1) A document is an exempt document if it contains matter the disclosure of which would involve the unreasonable disclosure of information concerning the personal affairs of any person (living or dead)."*

The information removed from Document 3a consists of the names of staff members of agencies in other jurisdictions. Consent has not been provided to release these names. The remaining information removed from this document is outside of the scope of your request.

The information removed from the remaining documents consists of the names of the authors of correspondence and other identifying information.

It is considered that a member of the public can correspond with a Minister without fear that their identity is released.

Accordingly, it is considered that disclosure of this information would be an unreasonable intrusion into the privacy rights of the individuals concerned.

Determination 4

I have determined that access to the following document is **granted in part**:

Doc No.	Description of document	No. of Pages
2	Minute from Chief Executive, Department of Primary Industries and Regions to Minister for Primary Industries and Regional Development dated 7/6/2022 re Feral Deer on Limestone Coast	4

The information removed from the above document is pursuant to Clause 6(1) and Clause 9(1) of Schedule 1 of the Freedom of Information Act.

The information removed pursuant to Clause 6(1) consists of the name of the author of the correspondence and other identifying information.

It is considered that a member of the public can correspond with a Minister without fear that their identity is released.

Accordingly, it is considered that disclosure of this information would be an unreasonable intrusion into the privacy rights of the individual concerned.

The information removed pursuant to Clause 9(1) consists of background details and advice provided to the Minister for decision-making purposes.

In addressing the public interest test for the exemption, I have balanced the following factors:

In favour of the public interest:

- Meeting the objects of the Act favouring access to documents
- Ensuring optimal use of public resources.
- High level of interest in the accountability of public office holders.

- The importance of transparency and openness and the interest that the public has in the decision-making processes of Government.

Contrary to the public interest:

- The recent age of the information was considered and the continuing relevance of the matters.
- The confidentiality of some information provided for context reasons must be maintained for decision-making purposes of Government.
- If information of this nature was disclosed, Departmental officers may be more hesitant when recording information which, in turn, may result in less effective and accurate detail being captured.
- Disclosing this information may compromise the manner in which information is gathered in the future for the decision-making processes of Government to the detriment of the betterment for South Australia.

Having considered the various factors weighing for and against disclosure, I have determined that disclosure of this information would, on balance, be contrary to the public interest.

The remaining information removed is outside of the scope of the request.

Determination 5

I have determined that access to the following documents is **granted in part**:

Doc No.	Description of document	No. of Pages
13	Minute from Chief Executive, Department of Primary Industries and Regions to Minister for Primary Industries and Regional Development dated 6/4/2022 re Commonwealth Funding – enhancing national pest animal and weed management encl letter from Minister for Agriculture and Northern Australia, Enhancing National Pest Animal and Weed Management Federation Funding Agreement - Environment	11

The information removed from the above document is pursuant to Clause 9(1) of Schedule 1 of the Freedom of Information Act.
The information removed pursuant to Clause 9(1) consists of background details provided to the Minister for decision-making purposes.

In addressing the public interest test for the exemption, I have balanced the following factors:

In favour of the public interest:

- Meeting the objects of the Act favouring access to documents
- Ensuring optimal use of public resources.
- High level of interest in the accountability of public office holders.

- The importance of transparency and openness and the interest that the public has in the decision-making processes of Government.

Contrary to the public interest:

- The recent age of the information was considered and the continuing relevance of the matters.
- The confidentiality of some information provided for context reasons must be maintained for decision-making purposes of Government.
- If information of this nature was disclosed, Departmental officers may be more hesitant when recording information which, in turn, may result in less effective and accurate detail being captured.
- Disclosing this information may compromise the manner in which information is gathered in the future for the decision-making processes of Government to the detriment of the betterment for South Australia.

Having considered the various factors weighing for and against disclosure, I have determined that disclosure of this information would, on balance, be contrary to the public interest.

The remaining information removed is outside of the scope of the request.

Determination 6

I have determined that access to the following document is **refused**:

Doc No.	Description of document	No. of Pages
3a	Attachment to Document 3 – Key Output Areas Project List dated 11/3/2022	15

Access to the above document is refused pursuant to Clause 5(1)(a)(i) of Schedule 1 of the Freedom of Information Act.

The document consists of detail relating to Commonwealth Government funding matters.

In addressing the public interest test for the Clause 5 exemption, I have balanced the following factors:

In favour of the public interest:

- Meeting the objects of the Act favouring access to documents.
- Ensuring optimal use of public resources.
- High level of interest in the accountability of public office holders.
- The importance of transparency and openness and the interest that the public has in the decision-making processes of Government.

Contrary to the public interest:

- The need to preserve confidentiality of information being shared between government agencies.
- The recent age of the information was considered and the continuing relevance of the matters.
- To release this information would harm inter-governmental relationships with the Commonwealth Government resulting in agencies reconsidering their position regarding their future interactions with the South Australia Government.

Having considered the various factors weighing for and against disclosure, I have determined that disclosure of this document would, on balance, be contrary to the public interest.

Determination 7

I have determined that access to the following document is **refused**:

Doc No.	Description of document	No. of Pages
19	Cabinet Briefing dated 30/5/2022	7

Access to the above document is refused pursuant to Clause 1(1)(f) of Schedule 1 of the Freedom of Information Act which states:

> *"**1 – Cabinet documents***
> *(1) A document is an exempt document –*
> *(f) if it is a briefing paper specifically prepared for the use of a Minister in relation to a matter submitted, or proposed to be submitted to Cabinet."*

The document consists of a briefing note specifically prepared for the use of the Minister in relation to a matter proposed for submission to Cabinet.

Determination 8

I have determined that access to the following document is **refused**:

Doc No.	Description of document	No. of Pages
20	Parliamentary Briefing Note dated 24/5/2022	3

Access to the above document is refused pursuant to Clause 17(c) of Schedule 1 of the Freedom of Information Act which states:

> *"**17 – Documents subject to contempt etc***
> *A document is an exempt document if it contains matter the public disclosure of which would, but for any immunity of the Crown –*
> *(c) infringe the privilege of Parliament."*

The document consists of a briefing note which was specifically prepared for the purpose of use in proceedings in Parliament. Disclosure of this information would infringe the privilege of Parliament.

If you are unhappy with this determination you are entitled to exercise your rights of external review with the Ombudsman SA. Alternatively, you can apply to the South Australian Civil and Administrative Tribunal (SACAT). If you wish to seek a review, you must do so within 30 calendar days of receiving this internal review determination.

For more information about seeking a review or appeal, please contact the Ombudsman SA on telephone (08) 8226 8699 or SACAT on 1800 723 767.

In accordance with the requirements of Premier and Cabinet Circular PC045, details of your application, and the document to which you are given access, will be published in the disclosure log on the PIRSA website. A copy of PC045 can be found at http://dpc.sa.gov.au/__data/assets/pdf_file/0019/20818/PC045-Disclosure-Log-Policy.pdf.

If you disagree with publication, please advise the undersigned in writing within fourteen calendar days from the date of this determination.

Should you require further information or clarification with respect to this matter, please contact Ms Cindy Roberts on 8226 2931 or email: Minister.Scriven@sa.gov.au.

Yours sincerely

C.M. Scriven

Hon Clare Scriven MLC
MINISTER FOR PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT
MINISTER FOR FOREST INDUSTRIES

13 / 10 / 2022

Hon Clare Scriven MLC
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Government of South Australia

DEPARTMENTAL WORKFLOW REQUEST

Department of Primary Industries and Regions (PIRSA)

Objective reference	eA197396
Title	Feral Deer in the South East – Clause 6(1)
Due to Minister's Office	17 June 2022
Date requested	3 June 2022

Rationale

The Minister has received correspondence from Clause 6(1) regarding feral deer management in the South East.

Action Required

Could you please provide the following:

- Briefing and draft reply for the Minister's consideration

Thank you kindly.

Contact

Mark Smith	8226 3379

Government of South Australia
Department of Primary Industries and Regions

Minute to
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Ref: A5470738

For	**Noting** and **Signature**
Critical Date	**17 June 2022**
Subject	**Feral Deer on Limestone Coast**

Synopsis

A member of the public Clause 6(1) , recently wrote to you to highlight issues caused by the increasing number of feral deer on the Limestone Coast. This briefing is to provide you with an overview of the feral deer situation and management response on the Limestone Coast, and to provide you with a draft letter of response to Clause 6(1) .

Recommendations

That you:

1. Note the information provided on the feral deer situation and management response on the Limestone Coast.

   NOTED

2. Sign the draft response letter to Clause 6(1) .

   SIGNED / NOT SIGNED

.....

Hon Clare Scriven MLC

Minister for Primary Industries and Regional Development

Minister for Forest Industries

/ / 2022

Ministerial Comments -

Background

Management of feral deer on the Limestone Coast

- Feral deer are a declared pest under the *Landscape South Australia Act 2019*, and land managers are required to remove them from their land. This is to protect our primary production industries, natural environment and road users from their impacts.
- Feral deer numbers are rapidly increasing across agricultural parts of SA, with a current total population of about 40,000.
- Of all of the landscape regions, the Limestone Coast region has the highest population of feral deer in the state, at about 24,000. Models indicate that if no new action is taken, this population could increase to over 67,000 by 2032.
- Clause 9(1)
- An aerial shooting program lead by the Limestone Coast Landscape Board has been in place for over a decade and is increasing in scale and intensity. The most recent program (April 2022) worked across 120,000 hectares, including 50 private properties, 24 DEW reserves, 7 Forestry Reserves and 1 pine plantation.
- The eradication of feral deer is a strategic priority for the Department of Primary Industries and Regions (PIRSA) and regional landscape boards; particularly in the Limestone Coast and Hills and Fleurieu regions, where impacts are highest.
- On 1 June 2022, you received an email from Clause 6(1) , seeking to bring to your attention the actions he is taking in response to the increasing number and impact of feral deer on the Limestone Coast.

Discussion

Correspondence

- Clause 6(1) and has a "zero tolerance" approach to feral deer.
- In her email to you, Clause 6(1) states that she has been controlling feral deer on her property for over 30 years, to demonstrate that eradication is possible, if everyone adopts a zero tolerance mindset.
- Clause 6(1)
- In her email Clause 6(1) states that in the Limestone Coast region people are divided and either want feral deer dealt with or want them to continue to exist for recreational hunting purposes.
- Clause 6(1)

- Clause 9(1) [redacted]
- In addition, unconfined feral deer spend the daytime sleeping on the Clause 6(1) Clause 6(1) property, where members hunt feral deer for recreation, and the night-time feeding on Clause 6(1) sheep pastures.
- Clause 6(1) has invited you to meet with her to discuss feral deer.
- A response letter to Clause 6(1) has been drafted for your consideration (Attachment A).

Farmer and Stakeholder impacts/ Regional Business and Stakeholder impacts

- Feral deer impact on a range of primary production types including cattle, sheep, cropping, viticulture, and forestry.
- Eradication of feral deer from SA has strong support from industry, landscape boards, state and Commonwealth governments.

Management of key risks

- Feral deer impact a range of production industries and so the benefit of investment in eradication, including aerial control operations, is expected to be significant. Recent independent cost-benefit analysis showed that the 10-year eradication program, costing $14 million, will generate a net benefit of $518 million over an 11-year period.

Consultation

- The General Manager of the Limestone Coast Landscape Board reviewed this brief and offered to coordinate a meeting with Clause 6(1)

Financial implications

- You recently executed an Agreement for $4 million in Commonwealth funding for 'Enhancing national pest animal and weed management' over four years (A5365693), $2 million of which will be used to cull feral deer.

Attachments

A. Draft response letter to Clause 6(1)
B. Clause 6(1) [redacted]

.....

For CHIEF EXECUTIVE
Department of Primary Industries and Regions

07 / 06 / 2022

CONTACT	Nathan Rhodes
POSITION	Executive Director
DIVISION	Biosecurity
MOBILE and LANDLINE	0412 376 450
Cleared by	Brad Page

Document ID: A5470737

Government of South Australia

The Hon Clare Scriven MLC

Clause 6(1)

Email: Clause 6(1)

Dear Clause 6(1)

Thank you for your email of 1 June 2022 regarding feral deer in the Southeast.

I share your concerns about the increasing number of feral deer across the state and their damaging impacts.

The Department of Primary Industries and Regions (PIRSA) and the Limestone Coast Landscape Board (the Board) are developing a plan to work with National Parks, Forestry, SA Water and private landholders to address the feral deer problem.

PIRSA will work with the Board to intensify control programs for feral deer in the Limestone Coast region over the next four years, with a focus on thermal-assisted aerial culling of feral deer. Importantly, PIRSA and the Board will ensure that all landholders are consulted and involved.

I recognise that opinions on the control of feral deer differ depending on perspective. Along with intensified control programs, PIRSA and the Board will seek to ensure that all landholders are meeting their legal obligations to destroy all feral deer on their properties as well as enforcing the requirements for deer farmers to confine their deer. I am pleased to advise that PIRSA and the Board plan to ramp up education, compliance, and enforcement initiatives.

Finally, I thank you for your invitation to meet with you. I would appreciate the opportunity to see the impacts of feral deer firsthand and find out more about your experience in tackling the problem. My office will be in contact to arrange a suitable time.

Once again, thank you for writing to me on this important issue.

Yours sincerely

Hon Clare Scriven MLC
MINISTER FOR PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT
MINISTER FOR FOREST INDUSTRIES

/ / 2022

Minister for Primary Industries and Regional Development
Minister for Forest Industries

GPO Box 1671 Adelaide SA 5001
Telephone 08 8226 2931 | Email minister.scriven@sa.gov.au

SOUTH AUSTRALIA

Government of South Australia
Department of Primary Industries and Regions

Minute to
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Ref: A5403342

For	**Noting**
Critical Date	Routine
Subject	**Centre for Invasive Species Solutions**

Synopsis

This briefing is to provide you with an overview of South Australia's participation in the Centre for Invasive Species Solutions (CISS); including project opportunities and Clause 5(1)(a)(i) Clause 5(1)(a)(i)

Recommendations

That you:

1. Note the brief outlining SA government participation in CISS and considerations for continuation of membership beyond the current CISS portfolio.

   NOTED

.....

Hon Clare Scriven MLC

Minister for Primary Industries and Regional Development

Minister for Forest Industries

/ / 2022

Ministerial Comments -

Background

- As Minister for Primary Industries and Regions, on behalf of the Government of South Australia, you are one of 10 full members of Invasive Animals Limited (IAL). The General Manager - Invasive Species in the Department of Primary Industries and Regions (PIRSA) Biosecurity is your delegate.
- IAL is the company that operates CISS, which facilitates research, development and extension (RD&E) projects on pest animals and weeds. South Australia, through PIRSA, the Department for Environment and Water (DEW) and regional landscape boards, is involved in CISS projects on rabbits, deer, wild dogs, cats, preventing new exotic animal incursions and weeds.
- The SA government membership of CISS is closely aligned with commitments to fund $3 million Biodiversity Coordination Unit in DEW to work with university researchers on management of the environmental impact of pests, weeds and abundant species.
- Membership of IAL has put South Australia in a position to influence the strategic direction of CISS, leverage Commonwealth research investment, and cost-share with States that have similar research needs.
- Over the past five years, PIRSA and DEW have leveraged funds through active involvement in CISS, Clause 5(1)(a)(i) .
- Through the current five-year CISS portfolio, Clause 5(1)(a)(i) Clause 5(1)(a)(i) , including:
  - Out of scope
  -
  - Registration of a new poison bait for feral deer, and a separate project to develop a bait hopper, which is only accessible by feral deer.
  - Leadership of the National Feral Deer Coordinator program.
  - Out of scope
- The current CISS portfolio ceases on 30 June 2022. CISS is now seeking support for a new Invasive Species Solutions 2030 (ISS2030) Initiative which it is designing collaboratively with Members (Attachment A).

Discussion

- The ISS2030 Initiative explicitly seeks to implement the RD&E priorities of national and state/territory policies and plans. These include:
  - Established pests: wild dogs, feral cats, foxes, mice, rabbits, tilapia and carp.

  Out of scope
- PIRSA, together with DEW and regional landscape boards, put forward 13 project concept submissions for consideration under the ISS2030 Initiative. These submissions cover feral deer, Out of scope Out of scope
- Clause 5(1)(a)(i)
-

- Clause 9(1)
-
-
- The PIRSA-based National Deer Management Coordinator is funded through CISS by the Commonwealth. From July 2022, PIRSA will receive funding for this coordinator position directly by the Commonwealth, until July 2023.

Farmer and Stakeholder impacts/ Regional Business and Stakeholder impacts

Out of scope

- PIRSA works closely with CISS on collaborative projects to give landholders the improved tools and knowledge to manage pests and weeds.

Consultation and engagement

- A draft of this briefing was reviewed by DEW and the General Managers of landscape boards.

Financial implications

- PIRSA and DEW have previously co-funded the annual membership fee to IAL, with this to change slightly to also include co-funding from Landscape Boards.
- Clause 9(1)
-

Attachments

A. ISS2030 Key Output Areas Project List _ 11 March 2022

for
CHIEF EXECUTIVE
Department of Primary Industries and Regions

22/4/2022

CONTACT	Nathan Rhodes
POSITION	Executive Director
DIVISION	Biosecurity
MOBILE and LANDLINE	0412 376 450, 08 8429 3135
PREPARED BY	Giverny Rodgers

Government of South Australia
Department of Primary Industries and Regions

MINISTER'S OFFICE
22 APR 2022
RECEIVED
eA197148

Minute to
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Ref: A5403342

For	**Noting**
Critical Date	Routine
Subject	**Centre for Invasive Species Solutions**

Synopsis

This briefing is to provide you with an overview of South Australia's participation in the Centre for Invasive Species Solutions (CISS); including project opportunities and Clause 5(1)(a)(i) Clause 5(1)(a)(i)

Recommendations

That you:

1. Note the brief outlining SA government participation in CISS and considerations for continuation of membership beyond the current CISS portfolio.

NOTED

C.M. Scriven

Hon Clare Scriven MLC
Minister for Primary Industries and Regional Development
Minister for Forest Industries
/ / 2022

Ministerial Comments -
I note the intent to continue membership for 2022-23.

Background

- As Minister for Primary Industries and Regions, on behalf of the Government of South Australia, you are one of 10 full members of Invasive Animals Limited (IAL). The General Manager - Invasive Species in the Department of Primary Industries and Regions (PIRSA) Biosecurity is your delegate.
- IAL is the company that operates CISS, which facilitates research, development and extension (RD&E) projects on pest animals and weeds. South Australia, through PIRSA, the Department for Environment and Water (DEW) and regional landscape boards, is involved in CISS projects on rabbits, deer, wild dogs, cats, preventing new exotic animal incursions and weeds.
- The SA government membership of CISS is closely aligned with commitments to fund $3 million Biodiversity Coordination Unit in DEW to work with university researchers on management of the environmental impact of pests, weeds and abundant species.
- Membership of IAL has put South Australia in a position to influence the strategic direction of CISS, leverage Commonwealth research investment, and cost-share with States that have similar research needs.
- Over the past five years, PIRSA and DEW have leveraged funds through active involvement in CISS, Clause 5(1)(a)(i) .
- Through the current five-year CISS portfolio, Clause 5(1)(a)(i) Clause 5(1)(a)(i) , including:
  - Out of scope
  -
  - Registration of a new poison bait for feral deer, and a separate project to develop a bait hopper, which is only accessible by feral deer.
  - Leadership of the National Feral Deer Coordinator program.
  - Out of scope
- The current CISS portfolio ceases on 30 June 2022. CISS is now seeking support for a new Invasive Species Solutions 2030 (ISS2030) Initiative which it is designing collaboratively with Members (Attachment A).

Discussion

- The ISS2030 Initiative explicitly seeks to implement the RD&E priorities of national and state/territory policies and plans. These include:
  - Established pests: wild dogs, feral cats, foxes, mice, rabbits, tilapia and carp.
  - Out of scope
  -
- PIRSA, together with DEW and regional landscape boards, put forward 13 project concept submissions for consideration under the ISS2030 Initiative. These submissions cover feral deer, Out of scope Out of scope
- Clause 5(1)(a)(i)
-

- Clause 9(1)
- The PIRSA-based National Deer Management Coordinator is funded through CISS by the Commonwealth. From July 2022, PIRSA will receive funding for this coordinator position directly by the Commonwealth, until July 2023.

Farmer and Stakeholder impacts/ Regional Business and Stakeholder impacts

- Out of scope
- PIRSA works closely with CISS on collaborative projects to give landholders the improved tools and knowledge to manage pests and weeds.

Consultation and engagement

- A draft of this briefing was reviewed by DEW and the General Managers of landscape boards.

Financial implications

- PIRSA and DEW have previously co-funded the annual membership fee to IAL, with this to change slightly to also include co-funding from Landscape Boards.
- Clause 9(1)

Attachments

A. ISS2030 Key Output Areas Project List _ 11 March 2022

for
CHIEF EXECUTIVE
Department of Primary Industries and Regions

22/4/2022

CONTACT	Nathan Rhodes
POSITION	Executive Director
DIVISION	Biosecurity
MOBILE and LANDLINE	0412 376 450, 08 8429 3135
PREPARED BY	Giverny Rodgers

Government of South Australia
Department of Primary Industries and Regions

Minute to
Minister for Primary Industries and Regional Development

cc: Minister for Climate, Environment and Water

Ref: A5398868

For	**Noting**
Critical Date	Routine
Subject	**Feral deer management in South Australia**

Synopsis

This briefing is to provide you with an overview of programs and opportunities to improve management of feral deer in SA, including funding secured and required for the eradication of feral deer from the state.

Recommendations

That you:

1. Note the brief on programs and opportunities for feral deer management in SA.

NOTED

.....
Hon Clare Scriven MLC
Minister for Primary Industries and Regional Development
/ / 2022

Ministerial Comments -

Background

- Feral deer numbers are increasing across agricultural parts of SA, with an estimated population of 40,000. Feral deer impact primary industries, the environment, and communities.
- SA's feral deer population is small compared with other parts of Australia, but it is projected to continue increasing, even with existing funding for culling programs.
- Significant control programs are needed in SA, to prevent populations from increasing to a point that they are impossible to get back under control.
- The eradication of feral deer is a strategic priority for the Department for Primary Industries and Regions (PIRSA) and regional landscape boards; particularly in the Limestone Coast and Hills and Fleurieu regions, where impacts are highest.
- A 10-year eradication program has been developed, budgeted at $14 million. About $4m of this has been secured over the first 3 years of the program
- Without significant additional control, the impacts of feral deer on industry and the environment will increase, as has occurred in the eastern states of Australia.

Discussion

Commonwealth funds and matched state funding

- You recently received a briefing recommending execution of a Funding Agreement to secure $4 million in Commonwealth funding for '*Enhancing national pest animal and weed management*' over four years (*A5365693*). PIRSA staff have been working with staff from the Commonwealth Department of Agriculture, Water and the Environment and regional landscape boards to draft this agreement.
- The Commonwealth Department of Agriculture, Water and the Environment offered this funding as part of a $20 million national program which targets established pests. Of the $4 million offered to PIRSA, $2 million is dedicated to the eradication of feral deer in SA.
- Funds provided under the national program required matching co-investment from the state government.
- In January 2022, the previous government approved co-investment of $600,000 for feral deer eradication over four years.
- State funding obtained via PIRSA appropriation and regional landscape board co-contributions will match the $2 million Commonwealth investment, providing at least $4 million of funding for feral deer control programs over the next four years.
- Additional funding from industry (Sheep Industry Fund, Cattle Industry Fund, Meat and Livestock Australia) is being sought.

SA Feral Deer Strategy

- The state Declared Animal Policy for feral deer was updated in 2018. There are now enforceable fencing and tagging standards, which are aimed at preventing the escape of farmed deer, which seed new feral populations and impede control of existing populations. The policy also requires landholders to destroy all feral deer on their properties.
- The next step is to implement the policy by seeking compliance with the requirements for keeping domestic deer and by eradicating feral deer.

- Population scenario modelling undertaken by PIRSA indicates that eradication of feral deer in SA is feasible within 10 years. To achieve this, coordinated and intensive ground and aerial control programs on public and private properties are needed, alongside the implementation of new and innovative control tools.
- PIRSA is also leading the development of these new control tools, with program funded by the Centre for Invasive Species developing both a new toxic bait for feral deer, and a deer-specific feeder to prevent access by native animals.
- Given new commitments to feral deer control in SA, an opportunity exists to develop a new strategy to inform the delivery of management priorities.
- PIRSA is also finalising the feral deer management strategy, which will be supported by recently-completed independent economic analysis of feral deer control options.

Economic Analysis

- Anticipating the need to put forward a business case for a feral deer eradication program in SA, Livestock SA, regional landscape boards and PIRSA requested an independent cost benefit analysis of feral deer control scenarios in South Australia (Attachment A).
- The economic analyses determined the net benefit of investing in a 10-year, $14 million feral deer control program in SA. The "eradication" scenario was compared against an ongoing "business-as-usual" scenario, based on historical levels of investment in feral deer culling.
- The business-as-usual scenario is expected in result in significant costs to landholders across a range of primary production types, through direct consumption of product, damage or contamination of product, or through competition with livestock for resources. Under the business-as-usual scenario, production losses are expected to increase from an estimated $36 million in 2020/21 to $242 million by 2031.
- The results of the cost benefit analysis indicate that the area-wide eradication program is a worthwhile investment. The net present value of $517.8 million indicates that, relative to business-as-usual, the eradication program will generate a net benefit to the community of $517.8 million over an 11-year period. The decision is considered to be worthwhile if the net present value is greater than zero.

National Feral Deer Coordinator

- State and National coordinator roles will support feral deer control programs in SA, with both roles being Commonwealth-funded, and based in PIRSA.
- These roles facilitate coordinated control of feral deer, build capacity, and establish links between farmers, commercial harvesters, and processors.
- PIRSA benefits from hosting the National Feral Deer Coordinator, for example by ensuring that SA priorities, particularly the development and trial of new control tools, are represented in the national approach, which guides Commonwealth funding priorities. SA also benefits from collaborations with other states.

Trial of thermal-assisted aerial culling for feral deer in SA

- As a part of the Commonwealth-funded National Feral Deer Management Program, PIRSA led a trial of thermal-assisted aerial culling (TAAC) of feral deer in the Limestone Coast region in September 2021.

- Aerial culling is increasingly being used across Australia as the primary tool for reducing impacts of feral deer over large areas. TAAC may improve the efficiency of aerial culls, by rapidly detecting more deer in dense vegetation, by re-acquiring feral deer that have split from targeted mobs, and by effectively checking animals are dispatched humanely and quickly. TAAC also enables culling from greater heights, reducing disturbance to livestock.
- TAAC technology is being used successfully on Kangaroo Island to eradicate feral pigs in the wake of the 2019/20 bushfires. TAAC was also trialled on sambar deer in the ACT in May and September 2021, with more trials planned in 2022.
- The TAAC trial in the Limestone Coast found many more feral deer than anticipated hiding in bushland canopies; up to 25 deer per square kilometre in some patches. During the 2.5-day trial, 190 feral deer were removed from vegetated areas.
- The high quality of the video enables feral deer to be easily recognisable from other large warm bodied wildlife such as kangaroos, or livestock such as sheep and cattle.
- TAAC will be the primary control tool used in the proposed feral deer eradication program.

Registration of a toxic bait

- Baiting is an efficient and widely used method for controlling established vertebrate pests, but there are no toxic baits registered for feral deer in Australia.
- The Feral Deer Toxic Bait Project is being led by PIRSA and is funded by the Centre for Invasive Species Solutions. This project aims to progress national registration of one or more toxic baits for feral deer with the Australian Pesticides and Veterinary Medicines Authority.
- PIRSA is developing and trialling deer-specific feeders to deliver future toxic baits, which aim to exclude native animals.

Farmer and Stakeholder impacts/ Regional Business and Stakeholder impacts

- Feral deer impact on a range of primary production types including cattle, sheep, cropping, viticulture, and forestry.
- Eradication of feral deer from SA has strong support from industry, landscape boards (Limestone Coast, Hills and Fleurieu, Northern and Yorke and Eyre Peninsula), state and Commonwealth governments, and the National Feral Deer Coordinator.
- Community support and participation by all landholders will be critical to eradicate feral deer at landscape scales. PIRSA (through State and National Coordinators) will continue to run landholder workshops on issues related to feral and domestic deer, raise awareness, and seek ways to work with landscape boards and communities.
- Some landholders who illegally harbour feral deer to provide hunting opportunities for themselves, or for others in return for payment, are not supportive of feral deer eradication.

Management of key risks

- Feral deer impact a range of production industries and so the benefit of investment in eradication is significant, compared with the overall program cost.

Attachments

A: Feral Deer Control Economic Analysis

for

CHIEF EXECUTIVE
Department of Primary Industries and Regions

12/4/2022

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FERAL DEER CONTROL ECONOMIC ANALYSIS

A Report for Primary Industries and Regions SA

1 April 2022

Prepared by

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BDO

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BDO

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ABBREVIATIONS

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
BCR	Benefit-Cost Ratio
CBA	Cost-Benefit Analysis
CPI	Consumer Price Index
EIA	Economic Impact Analysis
FTE	Full Time Equivalent
GRP	Gross Regional Product
GSP	Gross State Product
I-O	Input-Output
IRR	Internal Rate of Return
LGA	Local Government Area
NPV	Net Present Value
OBPR	Office of Best Practice Regulation
PIRSA	Department of Primary Industries and Regions South Australia
PV	Present Value

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EXECUTIVE SUMMARY

The Government of South Australia foresee a need to put forward a business case for enhanced investment in area-wide management to effectively eradicate feral deer within 11 years in South Australia and seeks a cost-benefit analysis (CBA) of this option to support the business case for investment.

The Government of South Australia is also seeking to understand the economic impact of this investment option on the South Australian economy and heavily impacted regions. Extended input-output (I-O) analysis was employed for estimation of regional economic impacts.

A key objective of this study was to undertake CBA to determine the net benefit of investing in an 11-year area-wide feral deer control program in South Australia with the intention of achieving effective eradication. This option was compared against an ongoing business-as-usual scenario based on historical levels of investment in feral deer population control methods.

The results indicate that according to the three evaluation criteria, the area-wide eradication program is a worthwhile investment. The net present value (NPV) of $517.8 million indicates that, relative to business-as-usual, the eradication program will generate a net benefit to the community of $517.8 million over an 11-year period. The decision rule is that the investment will be worthwhile if the NPV is greater than zero.

The internal rate of return (IRR) provides a measure for the rate of return to capital invested, here estimated to be 505 per cent for the eradication program. The decision rule for the project to be viable is that the internal rate of return (IRR) be greater than the discount rate which, for this project and projects of this kind is 7 per cent.

The BCR for the analysis was 2.7. This indicates that, in a broad sense, for every dollar of investment under the eradication program, $2.70 is returned to the SA community. For a project to be viable, the BCR must be greater than 1.0.

This report also presents the economic impacts of the eradication program[1] for the SA economy in terms of gross state product (GSP) and employment, and regional economies in terms of gross regional product (GRP) and employment. The regional economies analysed are Eyre and Western, Yorke and Mid North, Limestone Coast and an 'Adelaide[2]' region.

In the initial year (2021/22), the expected impact on total GSP is around $3.0 million, including flow-on effects. This is expected to increase to around $108.3 million in the fifth year and $216.9 million in the eleventh year of the eradication program. In terms of total employment, the expected impact in 2021/22 is 21 new FTE jobs, including flow-on effects. This is expected to increase to 222 FTE jobs in the fifth year and 425 FTE jobs in the eleventh year of the eradication program.

The report also provides details of economic impacts at a regional level.

This report does not value the socio-economic impacts on the wellbeing of private landholders affected by the impacts of feral deer, or the impacts of environmental damage caused by feral deer. Landholder wellbeing and environmental damage would likely be severely impacted if feral deer numbers continue to

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1 I.e. the economic impact of the area-wide eradication program activities and improved productivity of agricultural industries.

2 Comprising Barossa, Adelaide Hills and Fleurieu regions.

increase within South Australia. Accordingly, this report is likely to underestimate the extent of the positive economic impacts that would flow from achieving effective eradication of feral deer across South Australia.

1. INTRODUCTION

1.1. Background

Feral deer are deer that are not kept in captivity. All deer species in Australia were originally introduced by Europeans as game animals in the 19th century. Voluntary associations, known as acclimatisation societies, also sought to enhance the aesthetics of the Australian landscape and make Britain's colonial enterprises feel more like homeland England. These societies and objectives were not unique to Australia or feral deer species and occurred in many other countries throughout the world (such as New Zealand and the United States), introducing numerous other flora and fauna species (including rabbits, boar and foxes).

In recent decades, feral deer populations have grown or been established through deliberate release or the escape of deer from commercial deer farms.

In Australia, there are six species of feral deer, of which all but the hog deer can be found within South Australian borders (Deer Scan 2022):

- Fallow deer, *Dama dama*
- Red deer, *Cervus elaphus*
- Hog deer, *Axis procinus*
- Chital deer (also known as axis or spotted deer), *Axis axis*
- Rusa deer (also known as Timor deer), *Cervus timorensis*
- Sambar deer, *Cervus unicolour*.

Feral deer are an agricultural, environmental and social pest, damaging ecosystems and having a significant impact on economic activity. Feral deer (PIRSA 2021 and Landscape South Australia Murraylands and Riverlands 2015):

- damage or consume crops, pastures, saplings and native vegetation
- compete with livestock and native wildlife for food
- contribute to erosion in creek and river systems, leading to soil erosion and the fouling of waterholes
- are a hazard on roads, causing an increasing number of vehicle collisions
- cause damage to fences and infrastructure
- are a potential source of disease
- (males) can be aggressive during breeding season, presenting a threat to humans and other animals
- are associated with landholder 'incidental' costs such as property damage and constant repairs to farm fencing
- impact on the mental health of landholders due to erosion of business confidence, stress caused by illegal hunting and other feral deer impacts.

All of these impacts necessitate the importance of preventing feral deer populations from growing exponentially in the next few decades. However, reductions in feral deer populations are proportional to control efforts. It is estimated that 34 to 49 per cent of all feral deer within a population must be destroyed per year to avoid population growth (Hone et al. 2010).

Currently, several government-sponsored feral deer control programs operate in impacted landscape regions across South Australia. Over the last three financial years, these programs removed about 3,000 feral deer on average per annum. These programs use a range of management tools, including aerial shooting, ground shooting by professional marksman, ground shooting by volunteers/landholders and commercial harvesting (PIRSA 2021). In the 2020/21 financial year:

- The landscape levy, Forestry SA and National Parks and Wildlife Service removed around 300 fallow deer from the Hills and Fleurieu region under the Fleurieu Deer Control Program.
- The landscape levy funded the removal of close to 50 fallow deer from the Northern and Yorke Landscape Board Region by a commercial harvester. The National Parks and Wildlife Service also culled 195 fallow deer in parks in the Northern and Yorke region.
- Feral deer aerial and ground culling in the Limestone Coast region removed over 1,750 animals.
- In the Green Adelaide region, ground shooting by volunteers removed over 130 feral deer (PIRSA 2021).

The above figures do not include recreational hunting or removal by private landholders, estimated to contribute approximately 8,300 animals to feral deer control, for a combined estimated total of 11,300 feral deer removed per annum across South Australia.

The proposition for an 11-year South Australian feral deer eradication program would seek to effectively eradicate feral deer within South Australia. Efforts have already proved successful on Kangaroo Island, seeing the eradication of all feral deer populations in 2018. Other than Kangaroo Island, the only landscape board region that would not require any control program efforts is Alinytjara Wilurara where, due to harsh environmental conditions, it is not projected that substantial deer populations will establish.

Upon the conclusion of the eradication program, it is estimated that resident feral deer populations will be effectively eradicated from South Australia, with occasional, localised incursions occurring from escapes from commercial deer farms in South Australia or in-migration of feral deer from Victoria and New South Wales.

1.2. Purpose and Scope of the Economic Analysis

The Government of South Australia engaged BDO EconSearch to undertake economic analysis to assess feral deer impacts under two management scenarios:

- Scenario 1 (business-as-usual): Funding and level of deer control maintained at 2020/21 levels
- Scenario 2 (eradication): Funding and deer control activities increased to effectively eradicate feral deer within 11 years.

Scenario 2, being effective eradication, was compared against Scenario 1, acting as the business-as-usual option, in which feral deer population continued to grow exponentially and spread throughout the state.

The economic analysis includes:

- Cost-benefit analysis (CBA) to assess whether the eradication program is an efficient and appropriate use of government resources (i.e., whether the project provides a positive return to the community)
- Economic impact analysis (EIA) to assess the economic impact on the regional economy, using the extended input-output (I-O) RISE model.

The analysis focussed on the impacts on the agriculture industry and their flow-on effects. Analysis of the effects on the natural environment were out of scope.

1.3. Document Structure

An outline of the key characteristics of the CBA and I-O methods employed in this study, the scope of costs and benefits and data sources/assumptions are provided in Section 2 of the report. Results of the CBA, including key indicators and sensitivity analysis, are detailed in Section 3. The results of the economic impact analysis are provided in Section 4.

2. METHODS OF ANALYSIS AND DATA

2.1. Cost Benefit Analysis - Method and Data

2.1.1. Purpose and Scope of the Cost Benefit Analysis

The key objective of this study was to undertake a CBA of a strategic, state-wide feral deer eradication program within SA to determine the net benefit of Scenario 2 (eradication) compared with Scenario 1 (business-as-usual). The business-as-usual and eradication scenarios are described in Table 2-1.

Outcomes and consequences of each option were determined over time. The trajectories of the two investment options were assessed and the associated effectiveness of control at years 1 (2022) and 11 (2032).

Table 2-1 Alternative options for the CBA

Scenario	Description
Business-as-usual	In this scenario, combined state, National Parks, and regional landscape board management activities would continue to control the same proportion of the feral deer population each year, as would landholders and recreational hunters (legal and illegal) (approximately 27% of the population removed each year in total). After 11 years, this level of control is expected to result in a feral deer population of around 208,000 in SA, or just over 500% of the current estimated population of 40,000. This scenario is expected in result in significant costs to landholders across a range of primary production types, through direct consumption of product, damage or contamination of product, or through competition with livestock for resources (with production losses increasing from an estimated $36 million in 2020/21 to $242 million by 2031). Under this scenario, landholders would need to absorb the costs of deer impacts.
Eradication	Feral deer populations decrease dramatically by 2031 to around 780 feral deer, or 2% of the 2021 population. Feral deer populations are then maintained at low levels with low ongoing investment. Direct impact on value of primary productivity estimated to decline by about 97% by 2031. By 2031, the cost of feral deer to primary industries declines from an estimated $36 million (in 2020/21) to an estimated $0.9 million/year. The current feral deer population size of almost 40,000 would be effectively eradicated, with only a few feral deer incursions occurring through farm escapees and releases or in-migration from Victoria and NSW. In this scenario, after 2031, less than 50 feral deer would need to be destroyed in each region each year to maintain a very low population size. Benefits highlighted by landholders under this scenario include: • Increased production outputs • Less time spent controlling feral deer • Improved safety and wellbeing.

Source: PIRSA 2021

2.1.2. Method of Analysis

The CBA conducted for this project conforms to South Australian Commonwealth Government guidelines for conducting evaluations of public sector projects (Department of Treasury and Finance (2014) and OBPR (2020)).

The starting point for the economic analysis was to develop the 'business-as-usual' scenario, that is, the benchmark against which the eradication scenario was compared. It is important to note that the business-as-usual scenario is not a 'spend nothing' nor 'do nothing' scenario, but rather represents the current effort and investment. Given that costs and benefits were specified in real terms (i.e., constant 2021 dollars), future values were converted to present values by applying a discount rate of 7 per cent. The choice of discount rate is consistent with the rate commonly used by the South Australian Government in these types of analyses.

The economic analysis was conducted over a 10-year period and results were expressed in terms of net benefits, that is, the incremental benefits and costs of the eradication program relative to those generated by the business-as-usual scenario. The evaluation criteria employed for this analysis are described below.

- Net present value (NPV) - discounted[3] project benefits less discounted project costs. Under this decision rule an option was considered to be potentially viable if the NPV was greater than zero. The NPV for the eradication program has been calculated as an incremental NPV, using the standard formulation:

  NPV = (PV (eradication benefits - business-as-usual benefits)) - (PV (eradication costs - business-as-usual costs))

- Benefit-cost ratio (BCR) - the ratio of the present value of benefits to the present value of costs. Under this decision rule, the eradication program was considered to be potentially viable if the BCR was greater than one. The ration was expressed as:

  BCR = (PV (eradication benefits - business-as-usual benefits)) / (PV (eradication costs - business-as-usual costs))

- Internal rate of return (IRR) - the discount rate at which the NPV of a project is equal to zero. Under this decision rule, the eradication program was considered to be potentially viable if the IRR was greater than the benchmark discount rate (i.e., 7 per cent).

2.1.3. Data Sources

The costs and benefits of the eradication program were measured using a 'with' and without' project framework, that is, quantification of the incremental changes associated with the eradication program compared to the business-as-usual scenario. The method, data sources and assumptions used to quantify these values are described below. Consideration was given to those benefits and costs likely to occur over a 10-year period. The major economic costs and benefits of the project are listed in Table 2-2 and Table 2-3, respectively.

[3] Discounting refers to the process of adjusting future benefits and costs to their equivalent present-day values (Sinden and Thampapillai 1995)

Table 2-2 Costs of the feral deer management scenarios

Scenario	Description of cost	Bearer of cost	Valued in $ terms	Source of information
Business-as-usual	Cost categories as per Scenario 2			
Eradication (Scenario 2)	State-wide feral deer eradication program costs	Government	Yes	SA Government (PIRSA 2021)
	Private feral deer control/incidental costs	Industry	No	Industry (PIRSA 2021)
	Agriculture & forestry enterprise operating costs	Industry	Yes	ABARES 2021a, ABARES 2021b, Wine Australia 2021, PIRSA 2022a, PIRSA 2022b
	Deer traffic collision costs (property damage, injury, fatalities)	Community	Yes	AAMI 2019, TIC 2016, DIT 2020
	Social costs, e.g., mental health impacts caused by illegal hunting and trespassing	Industry	No	Industry (PIRSA 2021)

Source: BDO EconSearch

Table 2-3 Benefits of the feral deer management scenarios

Scenario	Description of benefit	Receiver of benefit	Valued in $ terms	Source of information
Business-as-usual	Benefit categories as per Scenario 2			
Eradication (Scenario 2)	Agriculture & forestry enterprise production revenue	Industry	Yes	PIRSA 2021

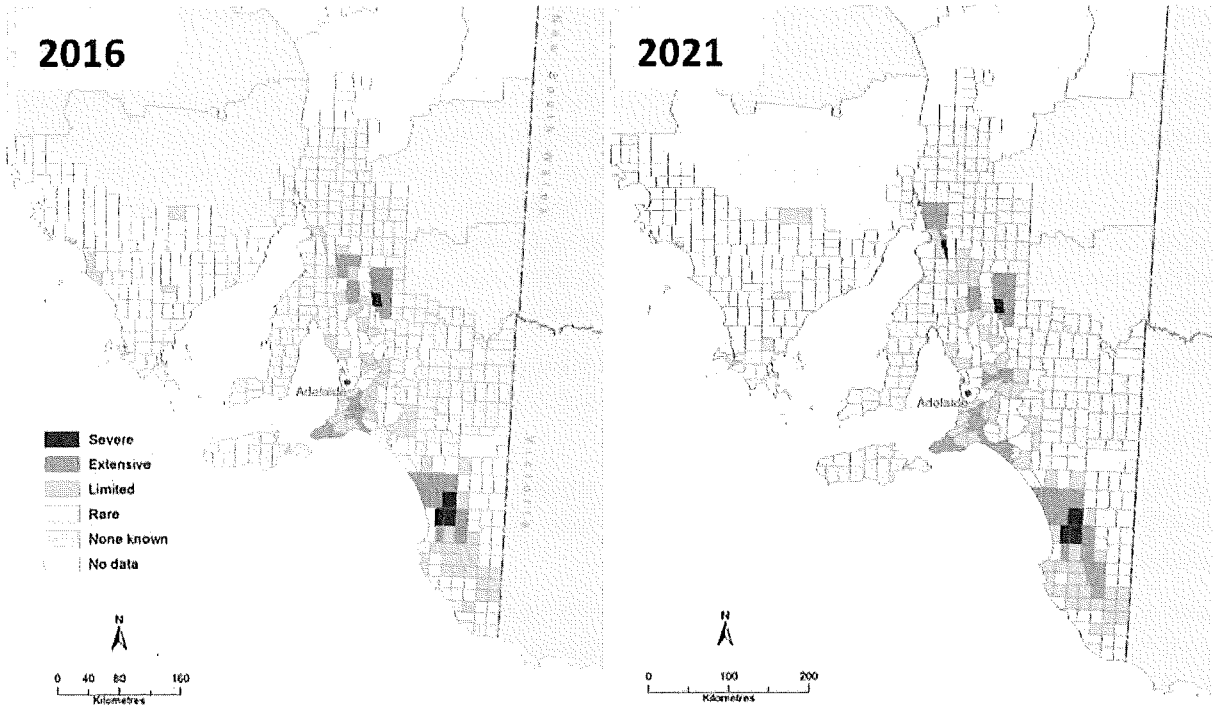
Source: BDO EconSearch

2.1.4. Feral Deer Population Modelling

Modelling the feasibility of effectively eradicating feral deer

Figure 2-1 shows current densities of feral deer reported in LGAs and displays their increasing distributions as reported by landscape board staff and Authorised Officers between 2016 and 2021. Figure 2-2 provides PIRSA estimates for the projected feral deer population under both scenarios with included margin of errors.

Figure 2-1 Distribution and densities of feral deer in South Australia in 2016 and 2021



Source: PIRSA 2021

Modelling was used to test the feasibility of effectively eradicating feral deer in South Australia under an 11-year eradication program (PIRSA 2021). The population of feral deer was projected, for South Australia and for each landscape board region separately, under both management scenarios for 11 years using the theta-logistic model (Gilpin and Ayala, 1973), adapted from the Ricker's model for estimating population abundance (Ricker, 1954 and Ricker, 1958). The model is underpinned by assumptions including incorporating 5 per cent variance in cull probability at the start of each year and 2 per cent variation in the maximum population growth rate.

Culling effort under the business-as-usual scenario was based on the current estimated proportion of the feral deer population culled in each landscape board region, each year. This proportional rate of culling was applied consistently in the model from 2021 to 2031. Applying a proportional rate of culling over the 11-year period is likely to produce a conservative estimate of population growth, as there may come a point where management agencies and landholders are unable to maintain this proportional cull as the population grows. In contrast, higher densities may mean that culling rates are achieved.

Whilst deer culled by management agencies was known (or close to), the number of deer culled by landholders and hunters was estimated based on landholder survey data. The number of deer that landholders reported culling was extrapolated for each region based on the expected total proportion of feral deer being removed each year when combined with government programs to produce a realistic population growth output.

Under the business-as-usual scenario, it was also assumed that the number of domestic deer escaping or being released in each region, each year, would remain consistent with the estimated number of escapees and releases provided for 2021 for each region.

Intensity of culling effort under the eradication scenario was assigned depending on projected population growth rates and associated estimated feral deer abundance. For example, up to 65 per cent of individuals need to be removed from a large population (>3,000) to drive population decreases within the desired timeframe, whereas only up to 38 per cent of a smaller population (10-100) needs to be culled to prevent population growth (Table 2-4). The numbers of feral deer that need to be culled per year for each landscape board region under the eradication option from 2021 to 2031 were estimated using the associated culling proportion for the population of feral deer remaining at the start of each year for each landscape region.

Modelling for the eradication scenario assumes that the number of domestic deer becoming feral is reduced to a negligible level prior to commencing control activities. This may require some investment in enforcement activities by landscape boards.

The model for both management options was run for 10,000 iterations to assess the effect of stochastic variation in input parameters (cull probability and rate of population increase) on abundance, and subsequent cull rates for each year.

Based on current management efforts (Scenario 1 - business-as-usual), the feral deer population would begin increasing exponentially in the next 10 years (depicted as the red line in Figure 2-2); resulting from insufficient proportion of the breeding deer population being culled each year (i.e. significantly less than the 39 per cent required to control numbers).

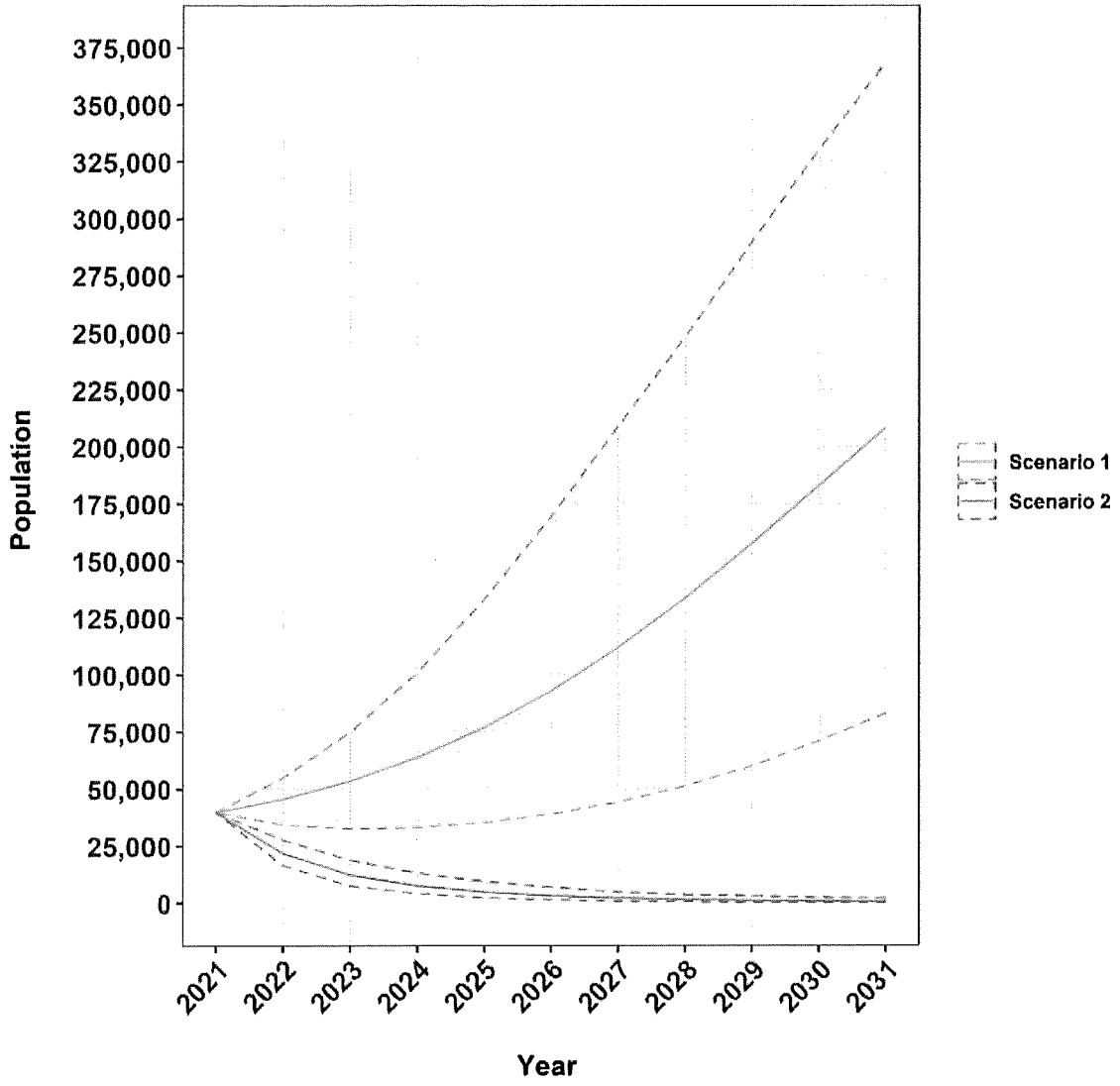
The modelling also shows the effective eradication of feral deer populations is achievable under the 11-year eradication program as shown by the blue line in Figure 2-2. Enhanced control efforts in the first five years of the program (2021/22 to 2025/26) are expected to lead to a substantial decline in feral deer numbers, reducing individual populations enough to prevent increasing population growth rates. However, it was indicated that continued strategic efforts would be needed in following years (2026/27 to 2031/32), particularly around the Limestone Coast region, to prevent future increases of feral deer populations in South Australia. The number of deer culled in each region, each year, under Scenario 2 is determined by the feral deer population in that region at the start of the year (Table 2-4).

Table 2-4 Proportion of the population culled each year under Scenario 2 within a Landscape Board region

Feral deer population size	Proportion culled
>3,000	0.65
2,000 - 3,000	0.60
100 - 2,000	0.55
10 - 100	0.38

Source: PIRSA 2021

Figure 2-2 Projected feral deer population under the different management scenarios



The red line shows abundance of feral deer inside South Australia under Scenario 1 (business-as-usual) and the red shade shows the confidence limits. The blue line shows the equivalent information for Scenario 2 (eradication).

Source: PIRSA 2021

Feral deer distribution and abundance

PIRSA provided projections of the likely change in feral deer populations within South Australia at 2021/22 and 2031/32, under the business-as-usual and eradication scenarios (Table 2-5). These estimates are based on ongoing monitoring of feral deer populations in South Australia and outputs of the population growth model when applied to each region. The estimates of the population by region (provided in Table 2-5) were used in the analysis.

Table 2-5 Estimated population projections of feral deer (no.s), South Australia

Landscape Board Region	Scenario 1 (business-as-usual)		Scenario 2 (eradication)	
	2021/22	2031/32	2021/22	2031/32
Alinytjara Wilurara	-	-	-	-
Eyre Peninsula	1,000	25,241	1,000	73
Green Adelaide	1,500	27,826	1,500	81
Hills & Fleurieu	8,000	33,099	8,000	147
Kangaroo Island	-	-	-	-
Limestone Coast	24,000	67,558	24,000	264
Murraylands & Riverland	300	13,429	300	48
Northern & Yorke	5,000	36,684	5,000	122
South Australian Arid Lands	50	4,569	50	42
Total	**39,850**	**208,406**	**39,850**	**777**

Source: PIRSA 2021

2.1.5. Quantified Costs and Benefits

Enterprise production revenue

Total agriculture productivity (revenue) losses were estimated based on a landholder survey undertaken by PIRSA in 2021 (PIRSA 2021). The landholder survey had 50 respondents, who manage properties covering 1,308 km^2, or 1.7 per cent, of feral deer affected areas in South Australia, excluding the three large government areas within the South Australian Arid Lands Landscape Board region.

Estimated productivity losses (as a percentage of productivity) were subtracted from total or predicted industry value[4] for each year. The affected commodities reported were beef, dairy, lamb, wool, non-irrigated crops[5], winegrapes and forestry. For 2021, industry values were calculated as the average value of the industry as reported by the Australian Bureau of Statistics for the last three financial years. Forestry values could not be obtained from the Australian Bureau of Statistics and were instead provided by the PIRSA Forestry Division. Resource values in 2031 cannot be known, so a conservative estimate of 1 per cent increase in real value per year was allocated.

Value of crops is grouped as landholder surveys did not separate crop type and many landholders reported rotating several crops on the same property.

All landholder surveys were conducted in areas impacted by deer, these were assumed to be areas classified as having extensive or severe deer density, as reported in Figure 2-1. Percentage impact of feral deer on primary production for each Hundred area was estimated by scaling the impacts reported in the survey (Table 2-6). This assumes a relationship between feral deer impacts and deer density.

[4] Farm-gate (local) value.

[5] Such as, cereal crops, pulses and hay.

Table 2-6 Scaling of percentage impact of feral deer on productivity to reflect deer density

Deer density	Percentage impact applied	Example
Severe or Extensive (25 - 100% of area infested)	Average percentage impact on production as reported in landholder survey	10% reduction in productivity value reported and applied
Limited (5 - 25% of area infested)	Average reported impact less 76%	2.4% reduction in productivity value applied
Rare (1 - 5% of area infested)	Average reported impact less 96%	0.4% reduction in productivity value applied
No data or None known	No impact	0% reduction in productivity value applied

Source: PIRSA 2021

For regions where an industry was present, but no survey results were available for that production type, PIRSA applied a conservative estimate of the percentage impact of feral deer on production for each density ranking, informed by the reported impact of feral deer on that production type in other regions.

The location of industries impacted by feral deer was mapped for South Australia, so that the value of each industry could be determined at the Hundred scale (Appendix 2). This was done in four steps:

1. The total land use area was calculated for each industry, for each SA Government Region.
2. The average annual product value was divided by the total land use area. This produced a productivity unit for each industry type for each SA Government Region.
3. The product value was calculated for each property by multiplying the productivity unit by property area.
4. Property productivity values were aggregated to the Hundred scale.

Based on the value distribution of each industry, the distribution and density of feral deer, and the direct value impact of feral deer on primary production reported by landholders, the cost of feral deer was estimated for each industry at the Hundred, and subsequently landscape board region scale.

Whilst it was possible to estimate how feral deer populations would change over time, the way in which these increasing or decreasing populations would be distributed could not be predicted. For example, it could not be known when an increase in deer numbers would result in an increase in deer density within an area, or when density would remain the same, but area impacted would expand. To deal with this, change in value of predicted annual productivity losses was assumed to be proportional to the increase or decrease in feral deer population for that landscape board region.

Models developed by BDO EconSearch (as described in Section 2.1.5) and estimates provided by PIRSA (Table 2-7) were used to derive and represent the gross margins and production revenue associated with the business-as-usual and eradication program scenarios.

Table 2-7 Total agriculture productivity (revenue) losses

Productivity Losses	Scenario 1 (business-as-usual)		Scenario 2 (eradication)	
Landscape Board Region	2021/22	2031/32	2021/22	2031/32
Alinytjara Wilurara	-	-	-	-
Eyre Peninsula	$307,000	$7,775,000	$307,000	$22,000
Green Adelaide	$42,000	$792,000	$42,000	$2,000
Hills & Fleurieu	$5,239,000	$21,674,000	$5,239,000	$97,000
Kangaroo Island	-	-	-	-
Limestone Coast	$16,775,000	$47,224,000	$16,775,000	$185,000
Murraylands & Riverland	$1,566,000	$70,095,000	$1,566,000	$251,000
Northern & Yorke	$12,003,000	$88,065,000	$12,003,000	$292,000
South Australian Arid Lands	$67,000	$6,151,000	$67,000	$57,000
Total	$35,999,000	$241,776,000	$35,999,000	$906,000

Source: PIRSA 2021

Projected cost to primary production under Scenario 1 may be an underestimate, as the number of industries reporting productivity losses may grow as the feral deer population becomes larger (e.g., horticultural producers).

The difference between the productivity loss in the business-as-usual and the productivity loss in the eradication program was treated as increased revenue for agricultural and forestry enterprises in the CBA.

Enterprise variable costs

Enterprise variable costs are the unique costs associated with producing a certain agricultural commodity. Differing from fixed costs, variable costs are only incurred proportionately with an increase (or decrease) in production. Some of the common variable costs associated with the agricultural sectors in question are:

- water and electricity,
- vehicle fuel, repairs and maintenance,
- transport i.e., freight,
- supplementary fodder (for livestock),
- seeds, fertiliser, pesticides and herbicides (for cropping),
- labour,
- insurance and levies.

Gross margin models for high rainfall, medium rainfall and low rainfall (represented as high rainfall, cereal zone and pastoral zone for livestock enterprises respectively) agriculture enterprises were developed for this study. As the ABS does not publish data on agriculture gross margins, other sources were utilised, oftentimes recording variable costs for different regions than those used by the ABS in calculating production revenue; for example, most of the following data are distributed based on rainfall region which significantly

differ to how revenue costs are spatially distributed by the ABS. Many of the agriculture enterprise gross margins were based on PIRSA *Farm Gross Margin Enterprise and Planning Guide* gross margins from 2022:

- Beef cattle (pastoral, cereal and high rainfall)
- Prime lamb (pastoral, cereal and high rainfall)
- Self-replacing (SR) merino (pastoral, cereal and high rainfall)
- Australia premium white (APW) wheat (medium and high rainfall)
- Export oaten hay (high rainfall).

Gross margins for the dairy and winegrapes industries were based on data from ABARES 2021b and Wine Australia 2021, respectively. Gross margins for the forestry industry, while determined a rotation period of newly planted saplings would not realise full growth within the 11-year time period of the eradication program, were based on a study by McCormack et al (2000) for the Joint Venture Agroforestry Program. All costs were updated to 2021/22 values where necessary.

Regions were designated based on average rainfall patterns:

- High rainfall = Green Adelaide, Hills & Fleurieu, Limestone Coast, Northern & Yorke
- Medium rainfall = Eyre Peninsula, Murraylands & Riverland
- Low rainfall = South Australian Arid Lands

Kangaroo Island was omitted as feral deer were eradicated in the region in 2018 and Alinytjara Wilurara was omitted as feral deer populations are not projected to spread into the region (and have significant impacts on the economy) within the next 10 years.

Enterprise fixed/overhead costs were not included as they were assumed to be constant under both scenarios.

Using the agriculture productivity losses as determined by PIRSA to occur throughout the next 10 years under both feral deer management scenarios (Table 2-7 and covered in detail in Appendix 2 in Appendix Table 3-1 to Appendix Table 3-7), variable costs were determined on a percentage basis of income and were assumed to decrease proportionately with income losses for livestock. For cropping, winegrapes and forestry losses, only harvesting costs were assumed to decrease proportionately with income losses.

Government control costs

Annual ongoing feral deer management costs were applied to the business-as-usual and eradication program scenarios. Information on costs was provided by PIRSA.

Business-as-usual

- Industry and SA Government: $1.1m/yr of aerial shooting, ground shooting and commercial harvesting in the landscape board regions of Green Adelaide, Hills and Fleurieu, Northern and Yorke and Limestone Coast

Eradication

- Industry and SA government: funding commitment of $11.55m to cover management costs and $2.4m to cover government staff costs over 11 years of eradication program (total budget of $13.95m). Breakdown of the annual funding within each landscape board region is outlined in Table 2-8 below.

Table 2-8 Annual funding commitment required under the eradication program for each region

Landscape Board Region	SA Arid Lands	Eyre Peninsula	Northern & Yorke	Murraylands & Riverland	Green Adelaide	Hills & Fleurieu	Limestone Coast
2022	-	$74,000	$600,000	$141,000	$206,000	$805,000	$2,224,000
2023	-	$73,000	$398,000	$140,000	$196,000	$404,000	$1,210,000
2024	-	$73,000	$148,000	$70,000	$73,000	$202,000	$606,000
2025	-	$72,000	$146,000	$70,000	$73,000	$147,000	$402,000
2026	-	$72,000	$73,000	$35,000	$72,000	$74,000	$202,000
2027	-	$72,000	$73,000	$35,000	$71,000	$73,000	$148,000
2028	-	$72,000	$72,000	$35,000	$70,000	$73,000	$146,000
2029	-	$70,000	$141,000	$35,000	$70,000	$72,000	$73,000
2030	-	$35,000	$70,000	$35,000	$35,000	$72,000	$73,000
2031	-	$35,000	$70,000	$35,000	$35,000	$70,000	$141,000
2032	-	$35,000	$35,000	$35,000	$35,000	$70,000	$141,000

Source: PIRSA 2021

Deer traffic collision costs

A current estimated cost of $155,924 per year was derived by BDO EconSearch through analysing national and state figures on vehicle/animal collisions. This cost was derived accordingly:

1. Statistics on the number of South Australian vehicle accidents caused by animal collisions were estimated. In 2020, there was 1 fatality, 7 serious injuries, 20 minor injuries, and 130 property damage only car crashes on South Australian roads (DIT 2020).
2. These statistics were adjusted by a national estimate of the proportion of insurance claims involving collisions with animals where deer was the animal involved. The estimated proportion was 1.6 per cent (152 of the 9,561 animal collisions reported in 2018/19, (AAMI 2019)), providing us with approximately 3 deer-related car crashes per year in South Australia at current population levels.
3. Applied an estimated cost per accident for each accident type (TIC 2016) and updated to current dollars using CPI (ABS 2022). Fatalities were estimated to cost society $2,831,441, serious injuries cost $723,522, minor injuries cost $26,427, and property damage only car crashes cost $10,640 per car crash on average.

Under these data and assumptions, and assuming costs would increase proportionately with feral deer population projections, an estimate of the costs under the business-as-usual and eradication scenarios is described in Table 2-9.

Table 2-9 Estimated feral deer traffic collision costs in South Australia

Scenario	2021/22	2031/32
Business-as-usual	$155,924	$815,445
Eradication	$155,924	$3,040

Source: BDO EconSearch analysis

2.1.6. Unquantified Costs

The following discussion is based on information collected via the landholder survey undertaken by PIRSA in 2021.

There are also costs that are more difficult to assign a dollar value to. PIRSA (2021) asked respondents if they would describe those impacts. Key themes included (i) landholder 'incidental' costs, (ii) business impacts, (iii) recreational hunting and (iv) environmental costs.

Landholder 'incidental' costs

Landholders surveyed reported $395,000 in incidental costs associated with feral deer over the past year (in total across all 50 respondents, 1.7 per cent of affected landholders). These included fencing and infrastructure repair, additional disease prevention measures, supplementary feed costs and costs associated with culling feral deer on their property (PIRSA 2021).

Reporting of incidental costs between landholders was highly variable and many landholders found it difficult to confidently value incidental costs when surveyed. Because of this, it was not considered appropriate to attempt to extrapolate these costs for the whole of the state.

Future surveys may seek to better quantify these costs as they are expected to impose a significant financial burden to landholders.

Business impacts

The presence of feral deer was reported to impact landholder wellbeing through impacting business confidence. In this way, feral deer impact the way landholders operate their business, without having a direct and measurable impact on profitability. Examples include (PIRSA 2021):

> "Confidence sapping"
>
> "Very frustrating. The vines are almost ready, and they eat them ... destroys whole years output"
>
> "They've just got to be eliminated".

Recreational hunting

Recreational hunting of feral deer is expected to contribute to local economies in positive ways through money spent on food, equipment and travel costs incurred by hunters when travelling to hunt for deer. It is also estimated that around 1,800 deer are culled by hunters in South Australia each year (legally and illegally) (PIRSA 2021).

Recreational hunting can also have significant negative impacts, particularly when it is carried out illegally. Many respondents to the landholder survey cited illegal hunting on their property by recreational deer hunters as a significant negative impact of feral deer. Due to the covert nature of illegal hunting, many

landholders were not able to provide a reliable estimate of how many illegal hunters were accessing their property. Many landholders stated that even if hunters offered to pay for access, they would not grant them with permission to shoot on their property.

Hunting of farmed deer on deer farms in South Australia may consist of guiding costs of about $500 per person, per day and between $1000-$2000 per deer shot, depending on size and species. If 500 deer are illegally shot on private property each year within SA, the cost of this activity could be estimated to be around $1,000,000 each year (i.e., value of activity is 'stolen' rather than paying to hunt on a property where permission has been granted to hunt).

> "So many people and so many hunters, they wouldn't be there if there wasn't a resource. They aren't going to pay to shoot if they can go on someone's property and do it for free." (PIRSA 2021).

This value does not consider infrastructure and stock damage reportedly caused by illegal hunters (cut fences, damaged gates, shot livestock), the safety issues caused by illegal hunting, or the mental stress that it causes landholders:

> "[The] poaching issue is extremely stressful. Have been out in the scrub at night and seen lights from an unknown source"
>
> "Can't feel safe to camp on the farm by myself anymore due to poachers" (PIRSA 2021).

In some instances, recreational hunters do seek permission to hunt on private land, but they are perceived as forceful or intimidating by landholders:

> "Have had visits over last 3-4 years from undesirable characters coming to the house asking to shoot. I have said no. Some have been to the point that I have almost had to call the police"
>
> "I have been home alone and have had people approach the property on motorbikes with guns saying they are there to hunt deer" (PIRSA 2021).

Environmental costs

Feral deer are known to cause significant environmental impacts, and this was noted by landholders when surveyed:

> "It's heart breaking to see impacts they have had on the vegetation and on the mallee fowl"
>
> "It's upsetting to see the damage that they are doing to the bush, the depletion of the bush and the impact that they have on native animals" (PIRSA 2021).

The environmental impacts of deer are listed as a Key Threatening Process under the *Threatened Species Act 1995*.

2.2. Economic Impact - Method and Data

This section describes the economic activity indicators (GSP and FTE employment) estimated in this analysis, and their components (direct, flow-on and total contributions).

2.2.1. Economic Activity

Economic activity indicators: the focus of this report is the generation of economic activity resulting from effectively eradicating feral deer within South Australia. The key economic activity indicators considered in the analysis are employment and GRP.

Economic impact: changes in economic activity are referred to as economic impacts. Generally, changes in economic activity indicators results from some stimulus or external shock imposed. In this analysis the concept of economic impact includes the increase in economic contribution from the effective eradication of feral deer within South Australia and the associated improved productivity agriculture makes to the economy. This economic impact is measured in terms of economic activity indicators referred to above.

2.2.2. Indicators of Economic Activity

Employment units: employment numbers are usually reported in either full-time equivalent (FTE) units or total job units defined as follows:

- *FTE*: is a way to measure a worker's involvement in a project or industry activity. An FTE of 1.0 means that the person is equivalent to a full-time worker, while an FTE of 0.5 signals that the worker is employed half-time. Typically, different scales are used to calibrate this number, depending on the type of industry but the basic calculation is the total hours worked divided by average annual hours worked in full-time jobs.
- *Jobs*: is used to refer to the number of workers employed in an industry or on a project at any point in time. It typically refers to either:
    - The *maximum* number of workers required at any point over the analytical period or the duration of the project; or
    - The *average* number of workers required over the analytical period/duration of the project. This can be calculated on a daily, weekly, monthly or annual basis.

In this report employment has been reported in terms of FTE units on a per annum basis.

Gross regional product (GRP): is a measure of the contribution of an activity to the economy. GRP is measured as value of gross output (business revenue) less the cost of goods and services (including imports) used in producing the output. In other words, it can be measured as the sum of household income, gross operating surplus and gross mixed income net of payments to owner managers and taxes less subsidies on products and production. It represents payments to the primary inputs of production (labour, capital and land). Using GRP as a measure of economic impact avoids the problem of double counting that may arise from using value of output for this purpose. Gross state product (GSP) is the equivalent of GRP at the state level.

2.2.3. Categories of Economic Activity

This section describes the components (direct, flow-on and total contributions) of the economic indicators described in Section 2.2.2. Estimates of economic contribution are presented in this study in terms of:

- direct contribution;
- flow-on (or indirect) contribution; and
- total contribution.

Direct contributions are the initial round of effects (i.e., employment and GSP) generated by an economic activity (i.e. government control costs, private landholder 'incidental' costs and agricultural enterprises).

Flow-on (or indirect) contributions are the sum of production-induced effects and consumption-induced effects. Production-induced effects are additional employment and GSP resulting from re-spending by firms (e.g., contractors) that receive payments from the sale of goods and services to the activities mentioned above. Consumption-induced effects are additional employment, household income and GSP resulting from re-spending by households that receive income from employment in direct and indirect activities.

Total contributions are the sum of direct and flow-on (indirect) contributions.

2.2.4. Economic Impact Models

Input-output (I-O) models are widely used to assess the economic impacts of existing or changing levels of economic activity[6]. The RISE I-O models of the regional economies, constructed by BDO EconSearch, are widely used by the Government. I-O models are available at the national, state and regional levels. 2018/19 RISE models for South Australia and the SA government regions of Eyre & Western, Limestone Coast and Yorke & Mid North were used for this assessment. In addition, an Adelaide region, comprising the Barossa, Adelaide Hills and Fleurieu areas, was developed specifically for this study. Table 2-10 lists the RISE model regions used in the analysis (excluding South Australia) and their corresponding LGAs.

Table 2-10 RISE model regions and their corresponding Local Government Areas (LGAs)

Adelaide	Eyre and Western	Limestone Coast	Yorke and Mid North
Adelaide Hills	Ceduna	Grant	Barunga West
Adelaide Plains	Cleve	Kingston	Clare and Gilbert Valleys
Alexandrina	Elliston	Mount Gambier	Copper Coast
Barossa	Franklin Harbour	Naracoorte Lucindale	Goyder
Gawler	Kimba	Robe	Mount Remarkable
Light	Lower Eyre Peninsula	Tatiara	Northern Areas
Mount Barker	Port Lincoln	Wattle Range	Orroroo/Carrieton
Victor Harbour	Streaky Bay		Peterborough
Yankalilla	Tumby Bay		Port Pirie
	Unincorporated SA		Wakefield
	Whyalla		Yorke Peninsula
	Wudinna		

Source: BDO EconSearch analysis

[6] Called an 'exogenous shock' in model terminology

2.2.5. Data and Assumptions

Further details of the data and assumptions used are provided in Section 2.1.5.

In addition to the assumptions embodied in the I-O model itself (see Appendix 1), it was necessary to make several other general assumptions in estimating the economic impacts:

- The impacts were measured using models that represent the structure of the regional economy for the year in which the most recent data are available (2018/19). However, over time there are likely to be improvements in primary factor productivity in these economies. To allow for the improvements as an across-the-board (all sectors) labour productivity improvement rate of 1 per cent per annum has been incorporated into the modelling.
- When new jobs are created, it should be determined where the people come from to fill those jobs. In some cases, the jobs will be taken by previously unemployed locals or by someone who is currently employed locally but whose own job is taken by a previously unemployed local. In both cases the impact of the newly created job and associated income is particularly offset by the fact that someone who was previously receiving unemployment benefits, for example, is no longer doing so. To calculate this effect requires estimates of the parameter rho (see Appendix 1), the proportion of new jobs that are likely to be filled by previously unemployed locals. A value for rho of 0.8 for South Australia and 0.6 for the regions were used.

BDO

3. COST BENEFIT ANALYSIS RESULTS

3.1. Results

The primary focus of the CBA in this study was the costs and benefits that accrue as a result of the feral deer eradication program. That is, the CBA was used to assist in the identification of, from a business-as-usual and eradication scenario, the option that maximises the net social benefits. The two scenarios were:

- Scenario 1 (business-as-usual): Feral deer control programs run by Government, and control by landholders and recreational shooters, with historical levels of funding leading to an exponential increase in feral deer numbers in the entirety of the state by 2031.
- Scenario 2 (eradication): South Australian eradication program with enhanced funding by Government to effectively eradicate feral deer within 11 years.

The eradication program was compared against the business-as-usual scenario.

The results of the economic analysis have been presented in terms of three evaluation criteria: net present value (NPV), benefit-cost ratio (BCR) and internal rate of return (IRR). NPV is a measure of the aggregate, annual net benefits (i.e., benefits - costs) of an option over a 10-year period, discounted (i.e., expressed as a present value[7]) using a discount rate of 7 per cent. BCR is the ratio of the present value of benefits to the present value of costs. IRR is the discount rate at which the NPV of a project is equal to zero[8].

While the impact analysis illustrates the economic activity arising from the proposed investment, the CBA shows whether the proposed investment represents an efficient use of public money.

The results of the CBA for the eradication program are described in Table 3-1. These results are based on expected values for key variables, as outlined in Section 2.1.5.

The results indicate that according to the three evaluation criteria used, the eradication program is a worthwhile investment. The NPV of $517.8 million indicates that, relative to the business-as-usual scenario, the eradication program will generate a net benefit to the community of $517.8 million over a 10-year period. The decision rule is that the investment will be worthwhile if the NPV is greater than zero.

The IRR provides a measure for the rate of return to capital invested, here estimated to be 505 per cent for the eradication program. The decision rule for the project to be viable is that the IRR be greater than the discount rate which, for this project and projects of this kind is 7 per cent.

The BCR for the analysis was 2.7. This indicates that, in a broad sense, for every dollar of investment under the eradication program, $2.70 is returned to the SA community. For a project to be viable, the BCR must be greater than 1.0.

Accordingly, the net benefits of increasing investment in achieving effective feral deer eradication outweigh the net benefits of maintaining the business-as-usual scenario with historical levels of funding which allow feral deer numbers to increase exponentially.

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[7] The present value is the value now of a sum of money arising in the future. Money now is worth more than money in the future because it could be invested now to produce a greater sum in the future. The present value of money in the future is calculated by discounting it at a rate of interest equivalent to the rate at which it could be invested (Bannock et al. 1979). A discount rate of 7 per cent was used in this economic analysis.

[8] For more detailed explanation of each criterion and the method of analysis see Section 2.1.

Table 3-1 CBA results of Scenario 2 (eradication)

	Business-as-usual ($m[a])	Eradication ($m[a])	Net result ($m[a])
Benefits (PV)			
Enterprise income	52,473.9	53,290.1	816.2
Total benefit (PV)	*52,473.9*	*53,290.1*	*816.2*
Costs (PV)			
Government control costs	8.8	11.9	3.1
Deer traffic collision costs	3.5	0.7	-2.8
Enterprise variable costs	28,973.8	29,272.0	298.8
Total costs (PV)	*28,986.2*	*29,284.6*	*298.4*
NPV			**517.8**
BCR			**2.7**
IRR			**505%**

[a] In 2021 dollars

Source: BDO EconSearch analysis

3.2. Sensitivity Analysis

The results of the CBA were re-estimated using values for key variables that reflect the uncertainty of those variables. The sensitivity analysis included the following:

- Discount rates
- Government control costs
- Production losses
- Deer proportion of vehicle/animal collisions
- Applying pessimistic values for all assumptions

The range of values used for each uncertain variable and detailed results of the sensitivity analysis are set out below with some interpretation of the results. Note that each sensitivity analysis for each variable was undertaken by holding all other variables constant at their 'expected' values. The assumptions and results of the sensitivity analysis are summarised and described in the following sections.

3.2.1. Discount Rates

Costs and benefits are specified in real terms (i.e., constant 2021 dollars) and future values are converted to present values by applying a discount rate of 7 per cent. A sensitivity analysis was conducted using discount rates of 4 and 10 per cent (Table 3-2).

As expected, the NPV improves with the lower (4 per cent) discount rate. This occurs because, although the bulk of the project costs are 'up front' and are not significantly affected by the discount rate, the benefits accrue over many years and are greater, in present value terms, when the discount rate is lower. With an

increase or decrease in discount rates, the positive NPVs indicate that the feral deer eradication program is still preferable to the business-as-usual scenario.

Note that the BCRs and IRRs are not affected by the discount rates. In fact, it can be interpreted as the discount rate at which the NPV is equal to zero.

Table 3-2 Results of the sensitivity analysis - discount rates

Discount rate	NPV ($m[a])	BCR	IRR
4%	626.7	2.7	505%
7%[b]	517.8	2.7	505%
10%	432.2	2.7	505%

[a] In 2021 dollars

[b] Expected value

Source: BDO EconSearch analysis

3.2.2. Government Control Costs

The government control costs, under both scenarios, have the potential to vary from current estimates. A sensitivity analysis was undertaken to illustrate the effect of a 25 per cent increase or 25 per cent decrease in this value. The results of this analysis are summarised in Table 3-3.

Table 3-3 Results of the sensitivity analysis - government control costs

Government control costs	NPV ($m[a])	BCR	IRR
25% less than expected	518.6	2.7	659%
Expected values	517.8	2.7	505%
25% more than expected	517.1	2.7	413%

[a] In 2021 dollars

Source: BDO EconSearch analysis

The results are shown to be slightly sensitive to changes in government control cost estimates. This means that a 25 per cent increase or decrease in estimated costs will have a minor impact on the project's viability (NPV>0, BCR>1 and IRR>discount rate of 7 percent), however all indicators remain substantially positive.

3.2.3. Production Losses

Consisting of the accumulated production losses of multiple agricultural industries, this estimate has the potential to vary from current estimates, and quite significantly depending on deer population densities and assumptions around the level of impact on production. Accordingly, a sensitivity analysis was undertaken to illustrate the effect of a 50 per cent decrease and a 50 per cent increase in this value. Due to the significance of this variable on the results of the analysis, a threshold analysis was also undertaken, i.e., an investigation of the necessary percentage change in the expected values to achieve a NPV of 0, BCR of 1 and IRR of 7 per cent. The results of this analysis are summarised in Table 3-4.

Table 3-4 Results of the sensitivity analysis - production losses

Production losses	NPV ($m[a])	BCR	IRR
No production losses (i.e., 100% less than expected)	6.9	NA	24%
50% less than expected	258.8	2.7	275%
Expected values	517.8	2.7	505%
50% more than expected	776.8	2.7	734%

[a] In 2021 dollars

Source: BDO EconSearch analysis

The results are shown to be moderately sensitive to changes in production loss estimates. This means that a 50 per cent increase or decrease in estimated costs will have a moderate impact on the project's viability, however all indicators remain substantially positive.

The additional threshold analysis indicates that if feral deer had no impact on agricultural production, the eradication scenario would still be preferable to business-as-usual, albeit marginally so. The BCR was reported as not applicable (NA) as, due to total benefits under the business-as-usual and eradication program scenarios aligning, the benefit to cost ratio entailed a value of 0 which does not make sense logically.

3.2.4. Deer Proportion of Vehicle/Animal Collisions

The value of 1.6 per cent, representing the proportion of vehicle/animal collisions caused by deer, is a national average recorded by a single insurance provider in the year 2019 (AAMI 2019). This estimate has the potential to vary from current estimates at a state level. Accordingly, a sensitivity analysis was undertaken to illustrate the effect of a 50 per cent decrease and a 100 per cent increase in this value. The results of this analysis are summarised in Table 3-5.

Table 3-5 Results of the sensitivity analysis - deer proportion of vehicle/animal collisions

Deer proportion of vehicle/animal collisions	NPV ($m[a])	BCR	IRR
50% less than expected	516.4	2.7	504%
Expected values	517.8	2.7	505%
100% more than expected	520.6	2.8	508%

[a] In 2021 dollars

Source: BDO EconSearch analysis

Despite greater percentage changes in the proportion of vehicular crashes caused by feral deer, these are still shown to have negligible effects on the results. This means that a 50 per cent decrease or 100 per cent increase in estimated costs will have almost no impact on the project's viability with all indicators remaining substantially positive.

3.2.5. All Values - Pessimistic Assessment

A sensitivity analysis was undertaken using the more pessimistic values in place of the expected values as follows:

- Discount rate - 9 per cent
- Government control costs - 25 per cent more than expected
- Production losses - 25 per cent less than expected
- Deer proportion of vehicle/animal collisions - 25 per cent less than expected.

The results of the sensitivity analysis are presented in Table 3-6.

Table 3-6 Results of the sensitivity analysis - pessimistic values

All values	NPV ($m[a])	BCR	IRR
Pessimistic values	347.5	2.7	320%
Expected values	517.8	2.7	505%

[a] In 2021 dollars

Source: BDO EconSearch analysis

The results (NPV) are shown to be sensitive to using pessimistic values in place of expected values for all assumptions, however all indicators remain substantially positive. This indicates that that the feral deer eradication program is still preferable to the business-as-usual scenario.

4. ECONOMIC IMPACT RESULTS

This section presents the economic impacts that the proposed feral deer eradication program[9] will make to the South Australian economy in terms of gross regional product (GRP) and employment.

Note that the impact measured here is the difference between the income and expenditures of Scenario 2 (with enhanced feral deer control funding to achieve effective eradication in 11 years) and Scenario 1 (business-as-usual with current feral deer control funding).

For South Australia, the impacts for the aggregated activities are presented first, followed by disaggregated impacts for agriculture production and government costs. For the regional analyses, the aggregated impacts are presented only.

The regional economies analysed are Eyre and Western, Yorke and Mid North, Limestone Coast and an 'Adelaide[10]' region. A list of the regional economies with their corresponding LGAs provided in Table 2-10.

4.1. South Australia

4.1.1. Aggregated Impacts

The aggregated activity includes:

- Increased productivity in agriculture operations
- Varying government control program costs from enhanced funding in feral deer population control

The aggregated economic impacts of Scenario 2 (eradication) on the South Australian economy are presented in terms of GSP and employment in Figure 4-1. Detailed economic impacts are presented in terms of GSP and employment (FTE) in Table 4-1.

In the initial year, the economic impact is driven by increased government costs of the eradication program. In the remaining years the main contributor to GSP and employment are the agriculture productivity improvements, which significantly outweigh the positive, then negative, economic impacts on GSP from increased, then reduced, government spending on program costs, as feral deer are effectively eradicated in South Australia.

In the initial year (Year 0, 2021/22), the expected impact on total GSP is around $3.0 million, including flow-on effects. This is expected to increase to around $108.3 million in the fifth year and $216.8 million in the eleventh year of the eradication program. In terms of total employment, the expected impact in the initial year is 21 new FTE jobs, including flow-on effects. This is expected to increase to 222 FTE jobs in the fifth year and 425 FTE jobs in the eleventh year of the eradication program.

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9 I.e., the contribution agriculture production and government cost impacts.

10 Comprising Barossa, Adelaide Hills and Fleurieu regions.

Table 4-1 Annual economic impacts of Scenario 2 (eradication) - aggregated activity, GSP and employment

	Gross state product, GSP ($m)				Employment (FTE)			
Year[a]	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total
0	1.2	1.0	0.7	3.0	9	7	5	21
1	15.4	5.7	2.1	23.2	4	38	15	57
2	29.8	10.5	3.5	43.8	1	70	25	95
3	44.6	15.6	5.1	65.3	0	102	36	139
4	59.3	20.6	6.7	86.7	-1	134	47	180
5	74.2	25.8	8.3	108.3	-2	166	58	222
6	89.0	31.0	10.0	130.0	-2	198	69	265
7	103.9	36.1	11.7	151.7	-1	228	79	306
8	118.7	41.3	13.3	173.3	-2	258	90	346
9	133.7	46.4	15.0	195.1	-2	288	100	386
10	148.5	51.6	16.7	216.8	-2	317	110	425

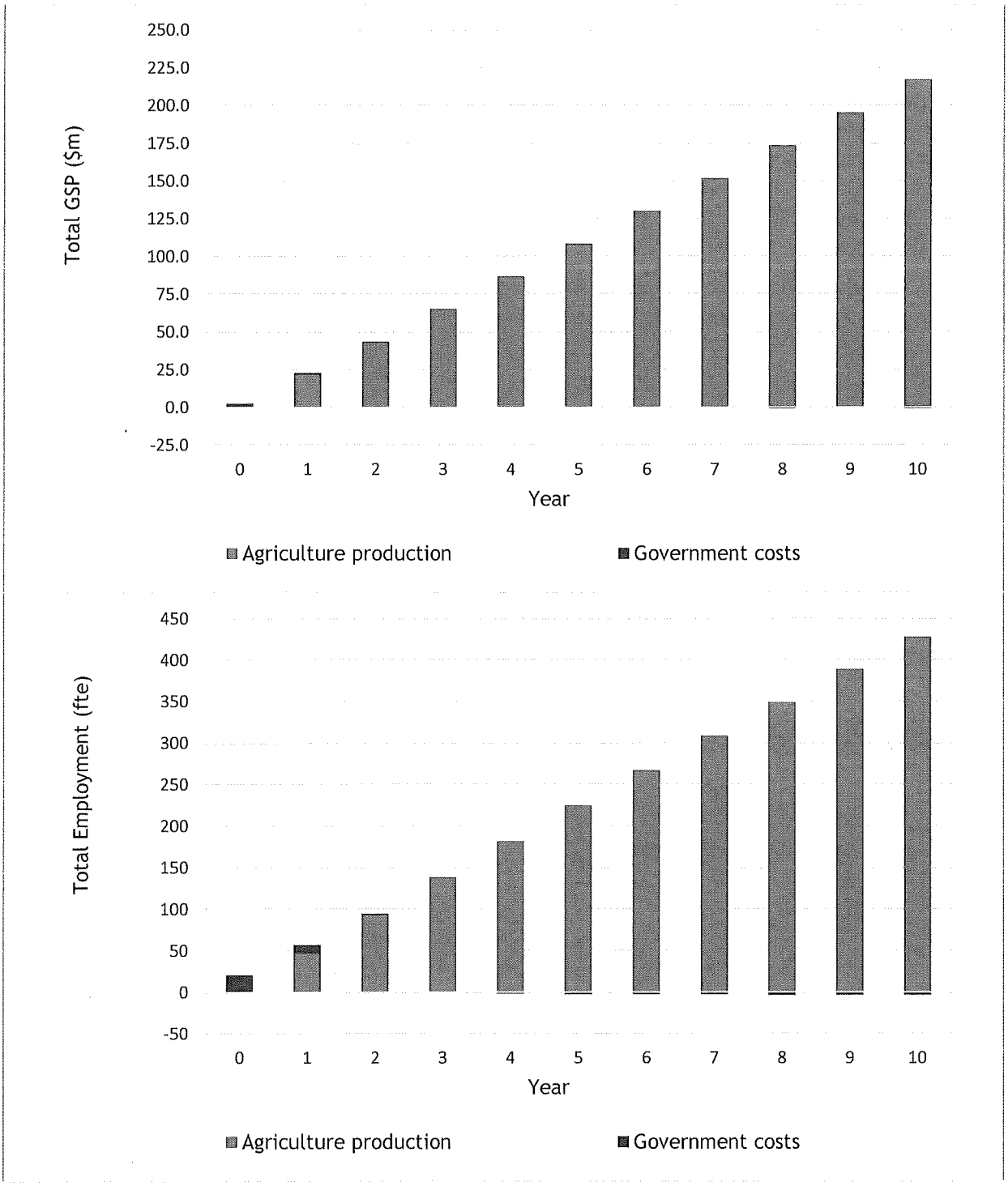
[a] Years 0 (2021/22) to Year 10 (2031/32)

[b] Prod. = Production

[c] Cons. = Consumption

Source: BDO EconSearch analysis

Figure 4-1 Economic impacts of Scenario 2 (eradication) - aggregated activity, GSP and emplyoment



Source: BDO EconSearch analysis

4.1.2. Agriculture Production

The economic impacts of the increased productivity in agricultural production under Scenario 2 on the South Australian economy are presented in Table 4-2 and Figure 4-2.

In the initial year (Year 0, 2021/22), the expected impact on total GSP is $0.0 million as the benefits of the eradication program have not yet been realised[11]. However, by the fifth year this is expected to increase to around $108.7 million and $217.4 million in the eleventh year of the eradication program, including flow-on effects. In terms of total employment, the expected impact in the initial year is 0 new FTE jobs. This is expected to increase to 225 FTE jobs in the fifth year and 428 FTE jobs in the eleventh year of the eradication program, including flow-on effects.

Table 4-2 Annual economic impacts of the increased agriculture productivity, GSP and employment

	Gross state product, GSP ($m)				Employment (FTE)			
Year	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total
0	0.0	0.0	0.0	0.0	0	0	0	0
1	14.9	5.2	1.7	21.7	0	35	12	47
2	29.7	10.4	3.4	43.5	0	69	24	93
3	44.6	15.5	5.0	65.2	0	102	36	138
4	59.5	20.7	6.7	86.9	0	135	47	182
5	74.4	25.9	8.4	108.7	0	167	58	225
6	89.2	31.1	10.1	130.4	0	198	69	267
7	104.1	36.2	11.8	152.1	0	229	80	309
8	119.0	41.4	13.5	173.9	0	259	90	350
9	133.9	46.6	15.1	195.6	0	289	101	389
10	148.7	51.8	16.8	217.4	0	318	111	428

[a] Years 0 (2021/22) to Year 10 (2031/32)

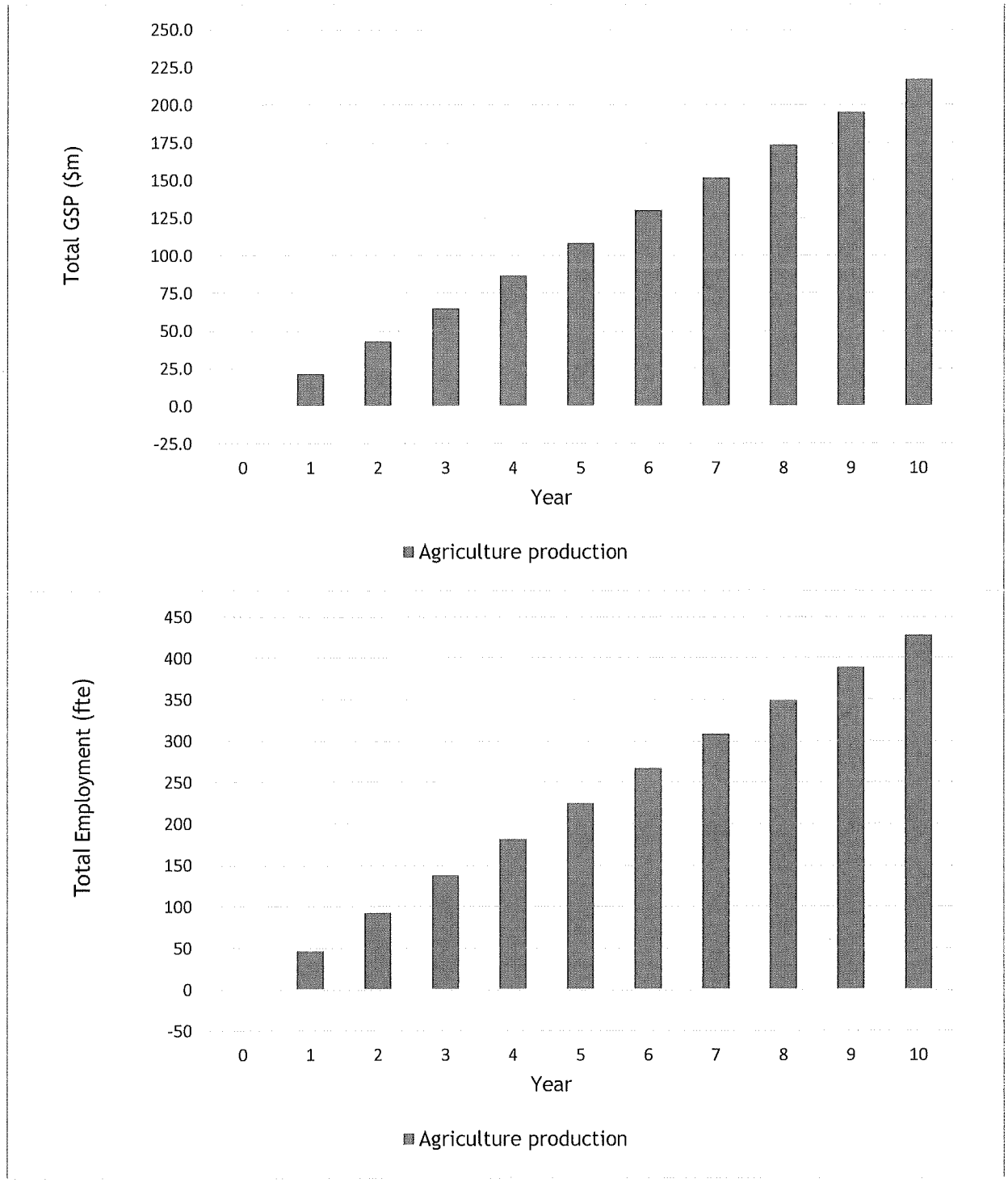
[b] Prod. = Production

[c] Cons. = Consumption

Source: BDO EconSearch analysis

[11] I.e. in year 2021/22 (year 0) there is no difference in agricultural between the eradication scenario and business-as-usual.

Figure 4-2 Economic impacts of Scenario 2 (eradication) - agriculture production, GSP and emplyoment



Source: BDO EconSearch analysis

4.1.3. Government Costs

The economic impacts of the government eradication costs of Scenario 2 on the South Australian economy are presented in Table 4-3 and Figure 4-3.

In the initial year (Year 0, 2021/22), the expected impact on total GSP is around $3.0 million, including flow-on effects. This is expected to decrease to around -$0.4 million in the fifth year as feral deer populations are reduced and control efforts can be lessened relative to the business-as-usual scenario. By the conclusion of the eradication program at year 11, the expected impact on total GSP is around -$0.5 million as feral deer are effectively eradicated. In terms of total employment, the expected impact in the initial year is 21 new FTE jobs, including flow-on effects. This is expected to decrease to a loss of 3 FTE jobs in the fifth year and a maintained reduction of 3 FTE jobs in the eleventh year of the eradication program as deer are effectively eradicated and no longer require substantial control efforts.

These negative GSP values and job losses imply, relative to the business-as-usual scenario, the economy loses up to $500,000 in potential GSP and 3 FTE jobs per year towards the end of the program life; this is because the greater feral deer numbers under the business-as-usual scenario require greater government expenditures (and more workers, both directly and indirectly) to control populations whereas the eradication scenario sees declining government expenditures (and fewer required workers) as feral deer populations die out.

Table 4-3 Annual economic impacts of Scenario 2 (eradication) costs, GSP and employment

	Gross state product, GSP ($m)				Employment (FTE)			
Year	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total
0	1.2	1.0	0.7	3.0	9	7	5	21
1	0.6	0.5	0.4	1.5	4	3	3	10
2	0.1	0.1	0.1	0.3	1	1	1	2
3	0.0	0.0	0.0	0.1	0	0	0	1
4	-0.2	-0.1	0.0	-0.3	-1	-1	0	-2
5	-0.2	-0.1	-0.1	-0.4	-2	-1	-1	-3
6	-0.2	-0.1	-0.1	-0.4	-2	-1	-1	-3
7	-0.2	-0.1	-0.1	-0.4	-1	-1	-1	-3
8	-0.3	-0.2	-0.1	-0.5	-2	-1	-1	-4
9	-0.2	-0.2	-0.1	-0.5	-2	-1	-1	-3
10	-0.2	-0.2	-0.1	-0.5	-2	-1	-1	-3

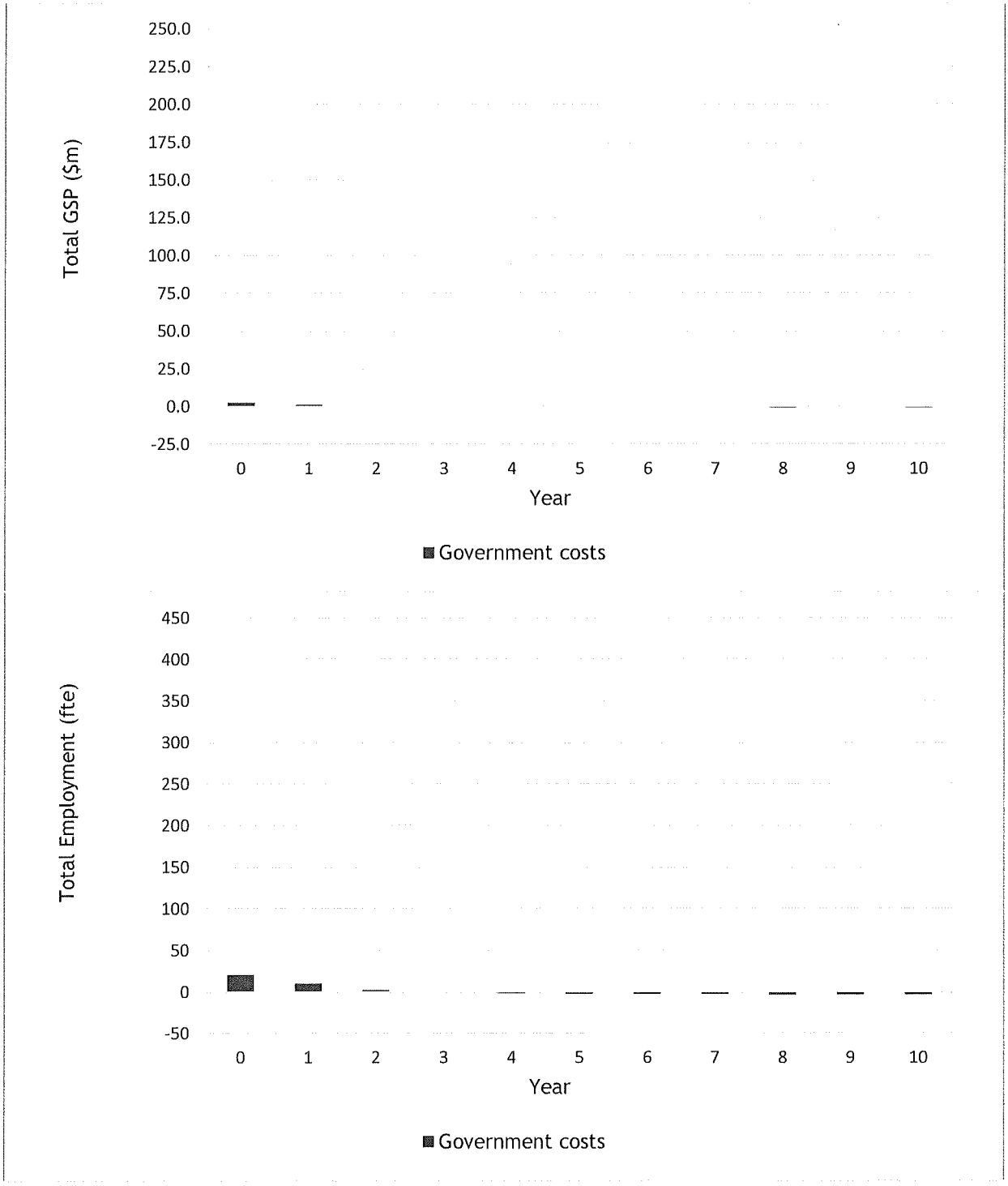
[a] Years 0 (2021/22) to Year 10 (2031/32)

[b] Prod. = Production

[c] Cons. = Consumption

Source: BDO EconSearch analysis

Figure 4-3 Economic impacts of Scenario 2 (eradication) - government costs, GSP and emplyoment



Source: BDO EconSearch analysis

4.2. Eyre and Western

4.2.1. Aggregated Impacts

Detailed economic impacts are presented below in terms of GRP and employment (FTE) in Table 4-4. The Eyre and Western region is comprised of the Eyre Peninsula landscape region.

In the first year (Year 0, 2021/22), the expected impact on GRP is less than $0.1 million, including flow-on effects. This is expected to increase to around $11.3 million in the fifth year and $22.5 million in the eleventh year of the eradication program. In terms of total employment, the expected impact in the initial year is less than 1 new FTE jobs, including flow-on effects. This is expected to increase to 9 FTE jobs in the fifth year and 17 FTE jobs in the eleventh year of the eradication program.

In the initial year the economic impact comes solely from government expenditures on the eradication program. Thereafter, most of the impact (99 per cent) is driven by agriculture productivity improvements.

Table 4-4 Annual economic impacts of Scenario 2 (eradication) - aggregated activity, Eyre and Western

	Gross regional product, GRP ($m)				Employment (FTE)			
Year	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total
0	0.0	0.0	0.0	0.0	0	0	0	0
1	2.0	0.3	0.1	2.3	0	2	0	2
2	3.9	0.5	0.1	4.5	0	3	1	4
3	5.9	0.8	0.2	6.8	0	4	1	6
4	7.8	1.0	0.2	9.0	0	6	2	7
5	9.7	1.3	0.3	11.3	0	7	2	9
6	11.7	1.5	0.3	13.5	0	9	2	11
7	13.7	1.8	0.4	15.8	0	10	3	13
8	15.6	2.0	0.4	18.0	0	11	3	14
9	17.5	2.2	0.5	20.3	0	12	3	16
10	19.5	2.5	0.6	22.5	0	14	4	17

[a] Years 0 (2021/22) to Year 10 (2031/32)

[b] Prod. = Production

[c] Cons. = Consumption

Source: BDO EconSearch analysis

4.3. Yorke and Mid North

4.3.1. Aggregated Impacts

Detailed economic impacts are presented below in terms of GRP and employment (FTE) in Table 4-5. The Yorke and Mid North region is comprised of the Northern and Yorke landscape region.

In the initial year (Year 0, 2021/22), the expected impact on GRP is $0.2 million, including flow-on effects. This is expected to increase to around $20.1 million in the fifth year and $40.1 million in the eleventh year of the eradication program. In terms of total employment, the expected impact in the initial year is 1 new FTE job, including flow-on effects. This is expected to increase to 17 FTE jobs in the fifth year and 33 FTE jobs in the eleventh year of the eradication program.

In the initial year, the economic impact is driven by increased government expenditures from the eradication program. In the remaining years the main contributor to GRP and employment arises from agriculture productivity improvements.

Table 4-5 Annual economic impacts of Scenario 2 (eradication) - aggregated activity, Yorke and Mid North

	Gross regional product, GRP ($m)				Employment (FTE)			
Year	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total
0	0.1	0.1	0.0	0.2	1	0	0	1
1	3.6	0.4	0.1	4.1	0	3	1	4
2	7.1	0.7	0.2	8.0	0	6	1	7
3	10.7	1.1	0.3	12.1	0	9	2	11
4	14.2	1.5	0.4	16.0	0	11	3	14
5	17.8	1.8	0.4	20.1	0	14	3	17
6	21.3	2.2	0.5	24.1	0	16	4	20
7	25.0	2.6	0.6	28.2	0	19	4	24
8	28.5	2.9	0.7	32.1	0	22	5	27
9	32.0	3.3	0.8	36.1	0	24	6	30
10	35.6	3.7	0.9	40.1	0	26	6	33

[a] Years 0 (2021/22) to Year 10 (2031/32)

[b] Prod. = Production

[c] Cons. = Consumption

Source: BDO EconSearch analysis

4.4. Limestone Coast

4.4.1. Aggregated Impacts

Detailed economic impacts are presented below in terms of GRP and employment (FTE) in Table 4-6. The Limestone Coast region is comprised of the Limestone Coast landscape region.

In the initial year (Year 0, 2021/22), the expected impact on GRP is $0.5 million, including flow-on effects. This is expected to increase to around $25.7 million in the fifth year and $51.6 million in the eleventh year of the eradication program. In terms of total employment, the expected impact in the initial year is 3 new FTE jobs, including flow-on effects. This is expected to increase to 51 FTE jobs in the fifth year and 99 FTE jobs in the eleventh year of the eradication program.

In the initial year, the economic impact is driven by increased government expenditures from the eradication program. In the remaining years the main contributor to GRP and employment arises from agriculture productivity improvements.

Table 4-6 Annual economic impacts of Scenario 2 (eradication) - aggregated activity, Limestone Coast

	Gross regional product, GRP ($m)				Employment (FTE)			
Year	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total
0	0.3	0.1	0.1	0.5	2	1	1	3
1	3.6	1.4	0.3	5.3	0	9	2	12
2	7.1	2.7	0.5	10.3	-1	18	4	21
3	10.6	4.1	0.8	15.4	-1	26	6	31
4	14.1	5.4	1.0	20.5	-1	34	8	41
5	17.6	6.8	1.3	25.7	-1	43	10	51
6	21.2	8.1	1.6	30.9	-1	51	11	61
7	24.7	9.5	1.8	36.0	-1	59	13	70
8	28.3	10.8	2.1	41.2	-1	66	15	80
9	31.9	12.2	2.4	46.4	-1	74	17	90
10	35.4	13.5	2.6	51.6	-1	81	18	99

[a] Years 0 (2021/22) to Year 10 (2031/32)

[b] Prod. = Production

[c] Cons. = Consumption

Source: BDO EconSearch analysis

4.5. Adelaide Region

4.5.1. Aggregated Impacts

Detailed economic impacts are presented below in terms of GRP and employment (FTE) in Table 4-7. The Adelaide region is comprised of the Green Adelaide and the Hills and Fleurieu landscape region.

In the initial year (Year 0, 2021/22), the expected impact on GRP is $0.1 million, including flow-on effects. This is expected to increase to around $6.8 million in the fifth year and $13.9 million in the eleventh year of the eradication program. In terms of total employment, the expected impact in the initial year is 1 new FTE job, including flow-on effects. This is expected to increase to 15 FTE jobs in the fifth year and 30 FTE jobs in the eleventh year of the eradication program.

In the initial year, the economic impact is driven by increased government expenditures from the eradication program. In the remaining years the main contributor to GRP and employment arises from agriculture productivity improvements.

Table 4-7 Annual economic impacts of Scenario 2 (eradication) - aggregated activity, Adelaide region

	Gross regional product, GRP ($m)				Employment (FTE)			
Year	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total	Direct	Prod. induced flow-on[b]	Cons. induced flow-on[c]	Total
0	0.0	0.0	0.0	0.1	0	0	0	1
1	0.8	0.4	0.1	1.3	0	3	1	3
2	1.7	0.8	0.1	2.6	-1	5	1	6
3	2.6	1.2	0.2	4.0	-1	8	2	9
4	3.5	1.6	0.3	5.4	-1	11	2	12
5	4.4	2.1	0.4	6.8	-1	13	3	15
6	5.3	2.5	0.4	8.2	-1	16	3	18
7	6.2	2.9	0.5	9.6	-1	18	4	21
8	7.1	3.3	0.6	11.0	-1	21	4	24
9	8.1	3.7	0.7	12.5	-1	23	5	27
10	9.0	4.1	0.7	13.9	-1	26	5	30

[a] Years 0 (2021/22) to Year 10 (2031/32)

[b] Prod. = Production

[c] Cons. = Consumption

Source: BDO EconSearch analysis

BDO

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Disclaimer

The assignment is a consulting engagement as outlined in the 'Framework for Assurance Engagements', issued by the Auditing and Assurances Standards Board, Section 17. Consulting engagements employ an assurance practitioner's technical skills, education, observations, experiences and knowledge of the consulting process. The consulting process is an analytical process that typically involves some combination of activities relating to: objective-setting, fact-finding, definition of problems or opportunities, evaluation of alternatives, development of recommendations including actions, communication of results, and sometimes implementation and follow-up.

The nature and scope of work has been determined by agreement between BDO and the Client. This consulting engagement does not meet the definition of an assurance engagement as defined in the 'Framework for Assurance Engagements', issued by the Auditing and Assurances Standards Board, Section 10.

Except as otherwise noted in this report, we have not performed any testing on the information provided to confirm its completeness and accuracy. Accordingly, we do not express such an audit opinion and readers of the report should draw their own conclusions from the results of the review, based on the scope, agreed-upon procedures carried out and findings.

BDO

APPENDIX 1 An Overview of Economic Impact Analysis Using the Input-Output Method

Economic impact analysis based on an input-output (I-O) model provides a comprehensive economic framework that is extremely useful in the resource planning process. Broadly, there are two ways in which the I-O method can be used.

First, the I-O model provides a numerical picture of the size and shape of an economy and its essential features. The I-O model can be used to describe some of the important features of an economy, the interrelationships between sectors and the relative importance of the individual sectors.

Second, I-O analysis provides a standard approach for the estimation of the economic impact of a particular activity. The I-O model is used to calculate industry multipliers that can then be applied to various development or change scenarios.

The input-output database

Input-output analysis, as an accounting system of inter-industry transactions, is based on the notion that no industry exists in isolation. This assumes, within any economy, each firm depends on the existence of other firms to purchase inputs from, or sell products to, for further processing. The firms also depend on final consumers of the product and labour inputs to production. An I-O database is a convenient way to illustrate the purchases and sales of goods and services taking place in an economy at a given point in time.

As noted above, I-O models provide a numerical picture of the size and shape of the economy. Products produced in the economy are aggregated into a number of groups of industries and the transactions between them recorded in the transactions table. The rows and columns of the I-O table can be interpreted in the following way:

- The rows of the I-O table illustrate sales for intermediate usage (i.e. to other firms in the region) and for final demand (e.g. household consumption, exports or capital formation).
- The columns of the I-O table illustrate purchases of intermediate inputs (i.e. from other firms in the region), imported goods and services and purchases of primary inputs (i.e. labour, land and capital).
- Each item is shown as a purchase by one sector and a sale by another, thus constructing two sides of a double accounting schedule.

In summary, the I-O model can be used to describe some of the important features of a state or regional economy, the interrelationships between sectors and the relative importance of the individual sectors. The model is also used for the calculation of sector multipliers and the estimation of economic impacts arising from some change in the economy.

Using input-output analysis for estimation of economic impacts

The I-O model conceives the economy of the region as being divided up into a number of sectors and this allows the analyst to trace expenditure flows. To illustrate this, consider the example of a vineyard that, in the course of its operation, purchases goods and services from other sectors. These goods and services would include fertiliser, chemicals, transport services, and, of course, labour. The direct employment created by

the vineyard is regarded in the model as an expenditure flow into the household sector, which is one of several non-industrial sectors recognised in the I-O model.

Upon receiving expenditure by the vineyard, the other sectors in the regional economy engage in their own expenditures. For example, as a consequence of winning a contract for work with vineyard, a spraying contractor buys materials from its suppliers and labour from its own employees. Suppliers and employees in turn engage in further expenditure, and so on. These indirect and induced (or flow-on) effects, as they are called, are part of the impact of the vineyard on the regional economy. They must be added to the direct effects (which are expenditures made in immediate support of the vineyard itself) in order to arrive at a measure of the total impact of the vineyard.

It may be thought that these flow-on effects (or impacts) go on indefinitely and that their amount adds up without limit. The presence of leakages, however, prevents this from occurring. In the context of the impact on a regional economy, an important leakage is expenditure on imports, that is, products or services that originate from outside the region, state or country (e.g. machinery).

Thus, some of the expenditure by the vineyard (i.e. expenditure on imports to the region) is lost to the regional economy. Consequently, the flow-on effects get smaller and smaller in successive expenditure rounds due to this and other leakages. Hence the total expenditure created in the regional economy is limited in amount, and so (in principle) it can be measured.

Using I-O analysis for estimation of regional economic impacts requires a great deal of information. The analyst needs to know the magnitude of various expenditures and where they occur. Also needed is information on how the sectors receiving this expenditure share their expenditures among the various sectors from whom they buy, and so on, for the further expenditure rounds.

In applying the I-O model to economic impact analysis, the standard procedure is to determine the direct or first-round expenditures only. No attempt is made to pursue such inquiries on expenditure in subsequent rounds, not even, for example, to trace the effects in the regional economy on household expenditures by vineyard employees on food, clothing, entertainment, and so on, as it is impracticable to measure these effects for an individual case, here the vineyard.

The I-O model is instead based on a set of assumptions about constant and uniform proportions of expenditure. If households in general in the regional economy spend, for example, 13.3 per cent of their income on food and non-alcoholic beverages, it is assumed that those working in vineyards do likewise. Indeed, the effects of all expenditure rounds after the first are calculated by using such standard proportions (i.e. multiplier calculations). Once a transactions table has been compiled, simple mathematical procedures can be applied to derive multipliers for each sector in the economy.

Input-output multipliers

Input-output multipliers are an indication of the strength of the linkages between a particular sector and the rest of the state or regional economy. As well, they can be used to estimate the impact of a change in that particular sector on the rest of the economy.

Detailed explanations on calculating I-O multipliers, including the underlying assumptions, are provided in any regional economics or I-O analysis textbook (see, for example, Jensen and West (1986)). They are calculated through a routine set of mathematical operations based on coefficients derived from the I-O transactions model, as outlined below.

The transactions table may be represented by a series of equations thus:

$$X_1 = X_{11} + X_{12} + \ldots\ldots\ldots\ldots\ldots + X_{1n} + Y_1$$
$$X_2 = X_{21} + X_{22} + \ldots\ldots\ldots\ldots\ldots + X_{2n} + Y_2$$
$$X_n = X_{n1} + X_{n2} + \ldots\ldots\ldots\ldots\ldots + X_{nn} + Y_n$$

where X_i = total output of intermediate sector *i* (row totals);

X_{ij} = output of sector *i* purchased by sector *j* (elements of the intermediate quadrant); and

Y_j = total final demand for the output of sector *i*.

It is possible, by dividing the elements of the columns of the transactions table by the respective column totals to derive coefficients, which represent more clearly the purchasing pattern of each sector. These coefficients, termed 'direct' or 'I-O' coefficients, are normally denoted as aij, and represent the direct or first round requirements from the output of each sector following an increase in output of any sector.

In equation terms the model becomes:

$$X_1 = a_{11}X_1 + a_{12}X_2 + \ldots\ldots\ldots\ldots\ldots + a_{1n}X_n + Y_1$$
$$X_2 = a_{21}X_1 + a_{22}X_2 + \ldots\ldots\ldots\ldots\ldots + a_{2n}X_n + Y_2$$
$$X_n = a_{n1}X_{11} + a_{n2}X_2 + \ldots\ldots\ldots\ldots\ldots + a_{nn}X_n + Y_n$$

where a_{ij} (the direct coefficient) = X_{ij}/X_j. This may be represented in matrix terms:

$X = AX + Y$

where A = $[a_{ij}]$, the matrix of direct coefficients.

The previous equation can be extended to:

$(I\text{-}A)X = Y$

where $(I\text{-}A)$ is termed the Leontief matrix,

or $X = (I\text{-}A)^{-1}Y$

where $(I\text{-}A)^{-1}$ is termed the 'general solution', the 'Leontief inverse' or simply the inverse of the open model.

The general solution is often represented by:

$Z = (I\text{-}A)^{-1} = [z_{ij}]$

The I-O table can be 'closed' with respect to certain elements of the table. Closure involves the transfer of items from the exogenous portions of the table (final demand and primary input quadrants) to the endogenous section of the table (intermediate quadrant). This implies that the analyst considers that the transferred item is related more to the level of local activity than to external influences. Closure of I-O tables with respect to households is common and has been adopted in this project.

The 'closed' direct coefficients matrix may be referred to as A^*. The inverse of the Leontief matrix formed from A^* is given by:

$Z^* = (I - A^*)^{-1} = [z^*_{ij}]$

Z^* is referred to as the 'closed inverse' matrix.

A multiplier is essentially a measurement of the impact of an economic stimulus. In the case of I-O multipliers the stimulus is normally assumed to be an increase of one dollar in sales to final demand by a sector. The impact in terms of output, contribution to gross regional product, household income and employment can be identified in the categories discussed below.

(i) The initial impact: refers to the assumed dollar increase in sales. It is the stimulus or the cause of the impacts. It is the unity base of the output multiplier and provides the identity matrix of the Leontief matrix. Associated directly with this dollar increase in output is an own-sector increase in household income (wages and salaries, drawings by owner operators etc.) used in the production of that dollar. This is the household income coefficient h_j. Household income, together with other value added (OVA), provide the total gross regional product from the production of that dollar of output. The gross regional product coefficient is denoted v_j. Associated also will be an own-sector increase in employment, represented by the size of the employment coefficient. This employment coefficient e_j represents an employment/output ratio and is usually calculated as 'employment per million dollars of output'.

(ii) The first round impact: refers to the effect of the first round of purchases by the sector providing the additional dollar of output. In the case of the output multiplier this is shown by the direct coefficients matrix $[a_{ij}]$. The disaggregated effects are given by individual a_{ij} coefficients and the total first-round effect by Σa_{ij}. First-round household income effects are calculated by multiplying the first-round output effects by the appropriate household income coefficient (h_j). Similarly, the first-round gross regional product and employment effects are calculated by multiplying the first-round output effects by the appropriate gross regional product (v_j) and employment (e_j) coefficients.

(iii) Industrial-support impacts. This term is applied to 'second and subsequent round' effects as successive waves of output increases occur in the economy to provide industrial support, as a response to the original dollar increase in sales to final demand. The term excludes any increases caused by increased household consumption. Output effects are calculated from the open Z inverse, as a measure of industrial response to the first-round effects. The industrial-support output requirements are calculated as the elements of the columns of the Z inverse, less the initial dollar stimulus and the first-round effects. The industrial support household income, gross regional product and employment effects are defined as the output effects multiplied by the respective household income, gross regional product and employment coefficients. The first-round and industrial-support impacts are together termed the production-induced impacts.

(iv) Consumption-induced impacts: are defined as those induced by increased household income associated with the original dollar stimulus in output. The consumption-induced output effects are calculated in disaggregated form as the difference between the corresponding elements in the open and closed inverse (i.e. $z^*_{ij} - z_{ij}$, and in total as $\Sigma(z^*_{ij} - z_{ij})$. The consumption-induced household income, gross regional product and employment effects are simply the output effects

multiplied by the respective household income, gross regional product and employment coefficients.

(v) Flow-on impacts: are calculated as total impact less the initial impact. This allows for the separation of 'cause and effect' factors in the multipliers. The cause of the impact is given by the initial impact (the original dollar increase in sales to final demand), and the effect is represented by the first-round, industrial-support and consumption-induced effects, which together constitute the flow-on effects.

Each of the five impacts are summarised in Appendix Table 1-1. It should be noted that household income, gross regional product and employment multipliers are parallel concepts, differing only by their respective coefficients h_j, v_j and e_j.

The output multipliers are calculated on a 'per unit of initial effect' basis (i.e. output responses to a one dollar change in output). Household income, gross regional product and employment multipliers, as described above, refer to changes in household income per initial change in output, changes to gross regional product per initial change in output and changes in employment per initial change in output. These multipliers are conventionally converted to ratios, expressing a 'per unit' measurement, and described as Type I and Type II ratios. For example, with respect to employment:

Type I employment ratio = [initial + first round + industrial support]/initial

and

Type II employment ratio = [initial + production induced[12] + consumption induced]/initial

Appendix Table 1-1 The structure of input-output multipliers for sector i[a]

Impacts	General formula
Output multipliers ($)	
Initial	1
First-round	$\Sigma_i a_{ij}$
Industrial-support	$\Sigma_i z_{ij}$-1-$\Sigma_i a_{ij}$
Consumption-induced	$\Sigma_i z^*_{ij}$-$\Sigma_i z_{ij}$
Total	$\Sigma_i z^*_{ij}$
Flow-on	$\Sigma_i z^*_{ij}$-1
Household Income multipliers ($)	
Initial	h_j
First-round	$\Sigma_i a_{ij} h_i$
Industrial-support	$\Sigma_i z_{ij} h_i$- h_j-$\Sigma_i a_{ij} h_i$
Consumption-induced	$\Sigma_i z^*_{ij} h_i$-$\Sigma_i z_{ij} h_i$

12 Where (first round + industrial support) = production induced.

Impacts	General formula
Total	$\Sigma_i z^*_{ij} h_i$
Flow-on	$\Sigma_i z^*_{ij} h_i - h_j$
Gross regional product multipliers ($)	
Initial	v_j
First-round	$\Sigma_i a_{ij} v_i$
Industrial-support	$\Sigma_i z_{ij} v_i - v_j - \Sigma_i a_{ij} v_i$
Consumption-induced	$\Sigma_i z^*_{ij} v_i - \Sigma_i z_{ij} v_i$
Total	$\Sigma_i z^*_{ij} v_i$
Flow-on	$\Sigma_i z^*_{ij} v_i - v_j$
Employment multipliers (full time equivalents)	
Initial	e_j
First-round	$\Sigma_i a_{ij} e_i$
Industrial-support	$\Sigma_i z_{ij} e_i - e_j - \Sigma_i a_{ij} e_i$
Consumption-induced	$\Sigma_i z^*_{ij} e_i - \Sigma_i z_{ij} e_i$
Total	$\Sigma_i z^*_{ij} e_i$
Flow-on	$\Sigma_i z^*_{ij} e_i - e_j$

[a] In a DECON model, Z^* (the 'closed inverse' matrix), includes a population and an unemployed row and column (see below for details).

Model assumptions

There are a number of important assumptions in the I-O model that are relevant in interpreting the analytical results.

- Industries in the model have a linear production function, which implies constant returns to scale and fixed input proportions.
- Another model assumption is that firms within a sector are homogeneous, which implies they produce a fixed set of products that are not produced by any other sector and that the input structure of the firms are the same. Thus it is preferable to have as many sectors as possible specified in the models and the standard models for this study were compiled with 66 sectors.
- The model is a static model that does not take account of the dynamic processes involved in the adjustment to an external change, such as a permanent change in natural resources management.

Extending the standard economic impact model as a DECON model

Based on work undertaken by EconSearch (2009 and 2010a) and consistent with Mangan and Phibbs (1989), the I-O model developed for this project was extended as demographic-economic (DECON) model. The two key characteristics of the DECON model, when compared with a standard economic model, are as follows.

1. The introduction of a population 'sector' (or row and column in the model) makes it possible to estimate the impact on local population levels of employment growth or decline.
2. The introduction of an unemployed 'sector' makes it possible to account for the consumption-induced impact of the unemployed in response to economic growth or decline.

The population 'sector'

The introduction of a population 'sector' to the standard I-O model allows for the calculation of population multipliers. These multipliers measure the flow-on population impact resulting from an initial population change attributable to employment growth or decline in a particular sector of the regional economy.

Calculation of population multipliers is made possible by inclusion of a population row and column in the 'closed' direct coefficients matrix of the I-O model.

Population row: the population coefficient (pj) for sector j of the DECON model is represented as:

$p_j = -rho_j * e_j *$ family $size_j$

where rho_j = the proportion of employees in sector j who remain in the region after they lose their job (negative employment impact) or the proportion of new jobs in sector j filled by previously unemployed locals (positive employment impact);

e_j = the employment coefficient for sector j; and

family $size_j$ = average family size for sector j.

Population column: the population column of the DECON model is designed to account for growth or decline in those sectors of the economy that are primarily population-driven (i.e. influenced by the size of the population) rather than market-driven (i.e. dependent upon monetary transactions). Clearly, many of the

services provided by the public sector fit this description and, for the purpose of this analysis, it was assumed that the following intermediate sectors were primarily population-driven:

- public administration and defence;
- education;
- health and community services; and
- cultural and recreational services.

Thus, the non-market coefficient for sector j of the DECON model is represented as expenditure on that non-market service (by governments) in $million per head of population.

The population multiplier for sector *j* is represented as: z^*_{pj} / p_{pj}

where z^*_{pj} = coefficient of the 'closed inverse' matrix in the population row for sector *j*; and

p_{pj} = coefficient of the direct coefficients matrix in the population row for sector *j*.

Sources of local data for the population sector of the DECON models used in this project included the following.

- rho: little or no published data are available to assist with estimation of this variable, particularly at a regional level. The DECON models have been constructed to enable the analyst to estimate this variable on the basis of the availability superior data or assumptions.
- Family size: in order to estimate average family size by industry, relevant data were extracted from the Australian Bureau of Statistics 2006 Census of Population and Housing using the TableBuilder database. These data were modified by the consultants in order to ensure consistency with the specification and conventions of the I-O models.

The unemployed 'sector'

As outlined above, the introduction of an unemployed 'sector' to the standard I-O model makes it possible to account for the consumption-induced impact of the unemployed in response to economic growth or decline.

Through the inclusion of an unemployed row and column in the 'closed' direct coefficients matrix of the standard I-O model it is possible to calculate Type III multipliers (for output, gross regional product, household income and employment).

The key point to note is that, in the situation where at least some of the unemployed remain in a region after losing their job (negative employment impact) or some of the new jobs in a region are filled by previously unemployed locals (positive employment impact), Type III multipliers will be smaller than the more frequently used Type II multipliers.

Unemployed row: the unemployed coefficient (u_j) for sector *j* of the DECON model is represented as:

$u_j = -rho_j * (1-ess_j) * e_j$

where rho_j = the proportion of employees in sector *j* who remain in the region after they lose their job (negative employment impact) or the proportion of new jobs in sector *j* filled by previously unemployed locals (positive employment impact);

ess_j = the proportion of employed in sector j who are not eligible for welfare benefits when they lose their job; *and*

e_j = the employment coefficient for sector j.

Unemployed column: the unemployed column of the DECON model is an approximation of total consumption expenditure and the consumption pattern of the unemployed. It is represented as dollars per unemployed person rather than $million for the region as a whole, as is the case for the household expenditure column in a standard I-O model.

Sources of local (i.e. state and regional) data for the unemployed sector of the DECON models used in this study included the following.

- ess: in order to estimate the proportion of employed by industry who are not eligible for welfare benefits when they lose their job, relevant data were extracted from the Australian Bureau of Statistics 2006 Census of Population and Housing using the TableBuilder database. These data were modified by the consultants in order to ensure consistency with the specification and conventions of the I-O models.
- Unemployed consumption: total consumption expenditure by the unemployed was based on an estimate of the Newstart Allowance whilst the pattern of consumption expenditure was derived from household income quintiles in the 2003/04 Household Expenditure Survey (ABS 2006).

Incorporating a tourism demand profile in the I-O model

Tourism expenditure is a measure of the value of sales of goods and services to visitors to the state or region. The following method and data sources were used to estimate tourism expenditure by industry sector for the region.

- The primary data were sourced from Tourism Research Australia (TRA).
- Base datasets included total tourism expenditure by TRA tourism region and average expenditure profiles, by region, across a range of goods and services (e.g. food and drink, fuel, shopping, etc.).
- Estimates were available for domestic day, domestic overnight and international visitor expenditure.
- The first adjustment to the base data was the development of a concordance between the TRA tourism regions and I-O model regions and the allocation of these base data to the relevant I-O model region. These allocations were based, in turn, on an ABS concordance between TRA tourism regions and SLAs.
- The second adjustment to the base data was the application of a more detailed expenditure breakdown from the ABS Australian National Accounts: Tourism Satellite Account for both domestic and international visitor expenditure (ABS 2010d).
- The third adjustment to the base data was the conversion of tourism expenditure estimates from purchasers' to basic prices (i.e. reallocation of net taxes (taxes minus subsidies) and marketing and transport margins) to make the data consistent with accounting conventions used in the national, state and regional I-O models. Purchasers' to basic price ratios for tourism expenditure categories were derived from ABS data.

- The final adjustment to the base data was the allocation of the tourism expenditure data in basic prices to the relevant input-output sectors (intermediate sectors, taxes less subsidies or imports) in which the expenditure occurred, thus compiling a profile of sales to final demand. This process was undertaken for each type of tourism expenditure (domestic day, domestic overnight and international visitor) and the results aggregated to form a single tourism demand profile. Profiles were developed at the state and regional levels.

Constructing a RISE v7.01 economic impact model

In the final model construction stage the data described above were incorporated into a *Microsoft Excel®* spreadsheet based economic impact model for the region and state (i.e. *RISE v7.01*)[13]. This model allows for description of the structure of the economy. It can also be used for the estimation of economic impacts over time in response to the introduction of a new industry or a change in the final demand for the output of one or many sectors. Model assumptions can be modified to account for:

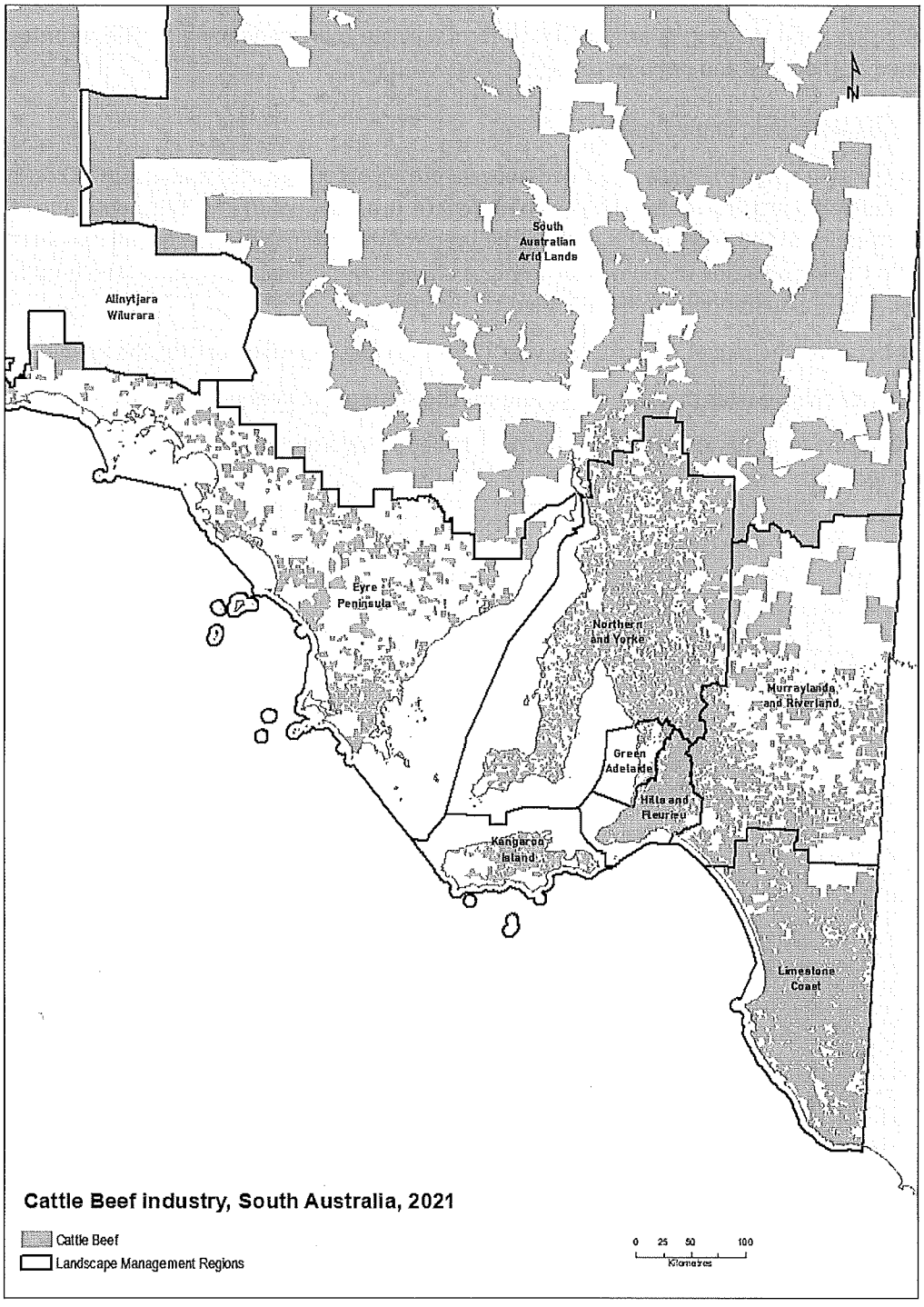
- price changes between the model construction year (2018/19) and the base year for the analysis;
- labour productivity change over time (as above and for the subsequent years);

the level of regional migration (e.g. for a positive employment impact, the proportion of new jobs filled by previously unemployed locals).

[13] For further details on the use and application of this type of model see BDO EconSearch (2020).

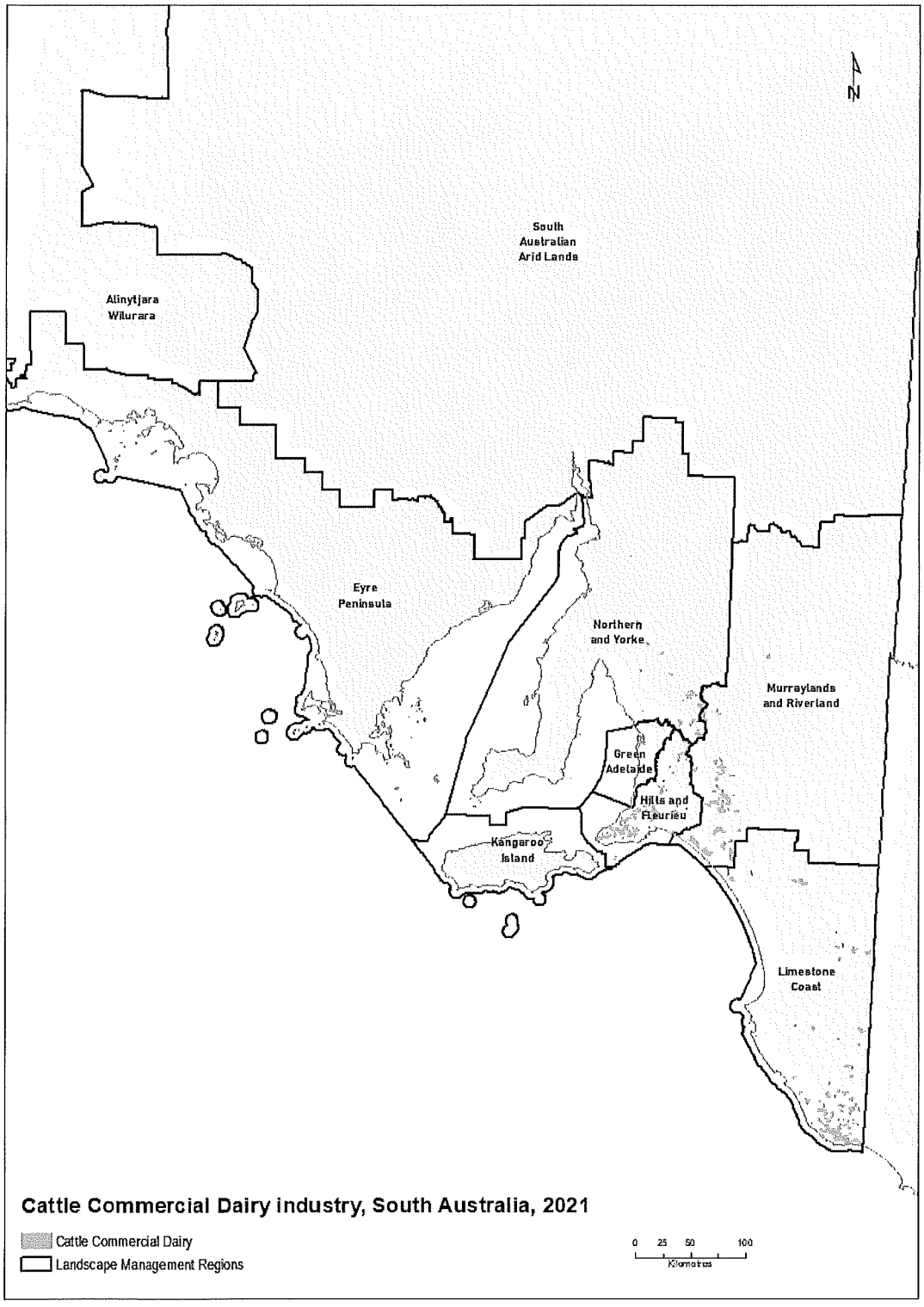
APPENDIX 2 Location of Industries Reporting an Impact of Feral Deer

Appendix Figure 2-1 Cattle (beef)



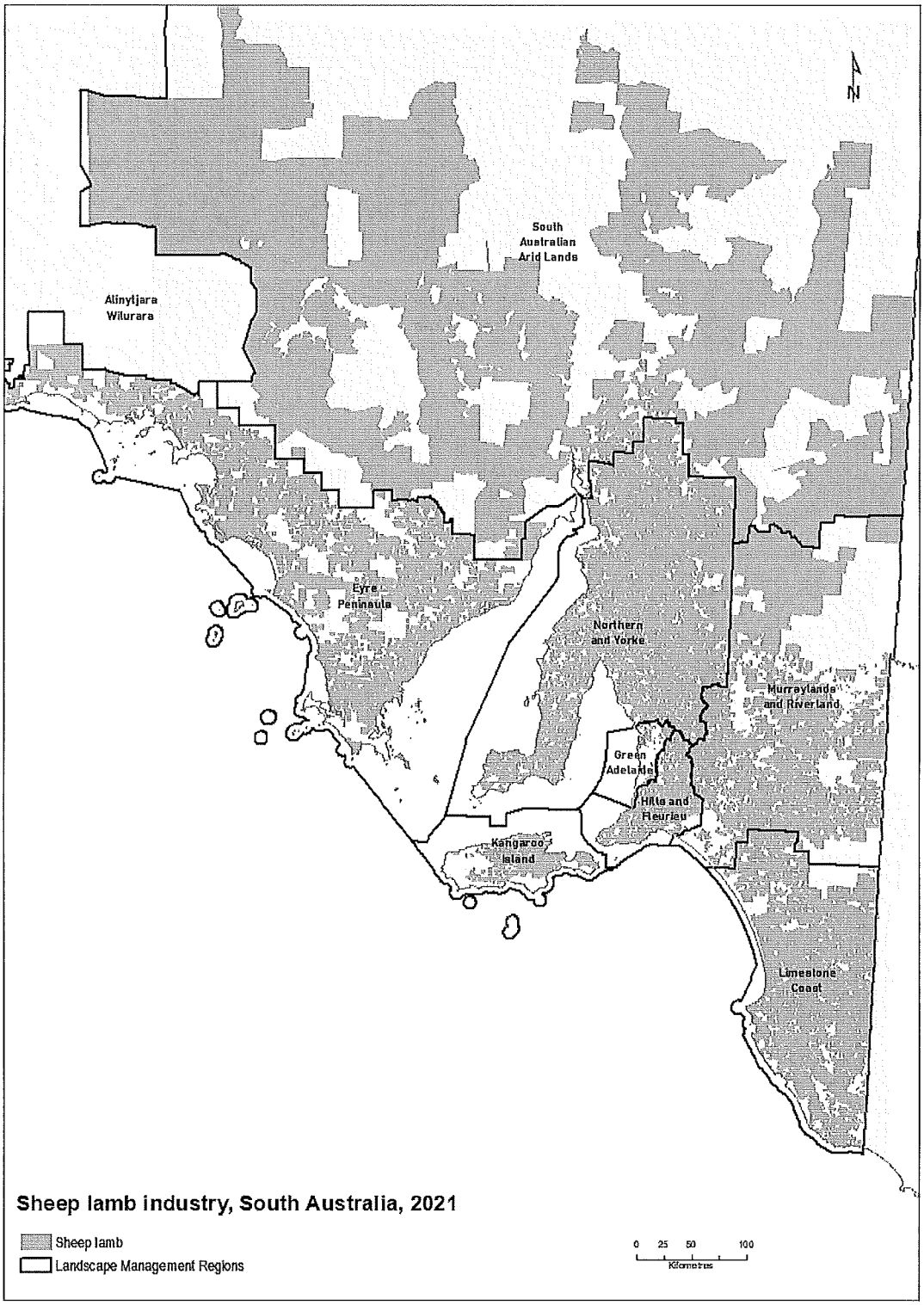
Source: PIRSA 2021

Appendix Figure 2-2 Cattle (dairy)



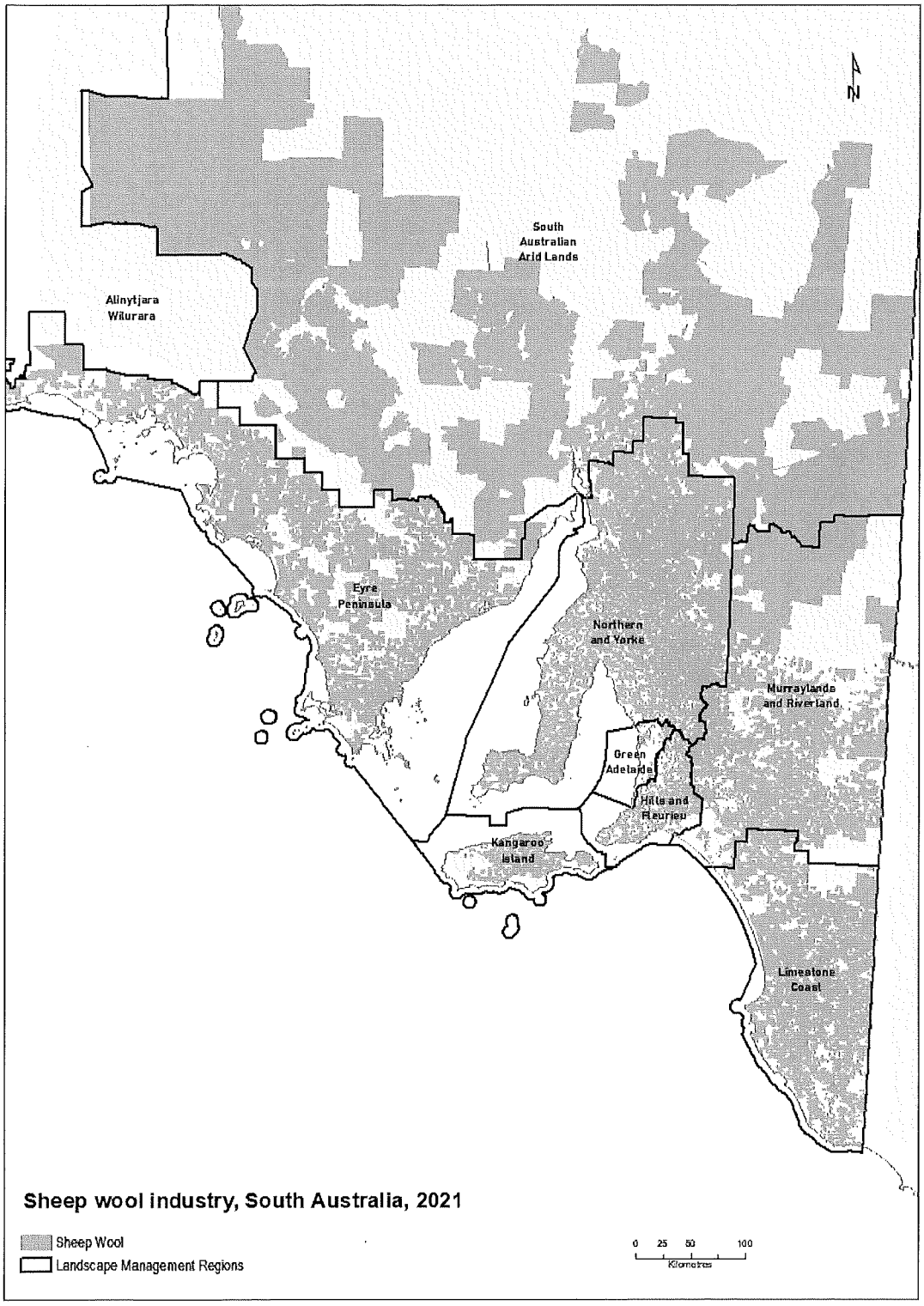
Source: PIRSA 2021

Appendix Figure 2-3 Sheep (lamb)



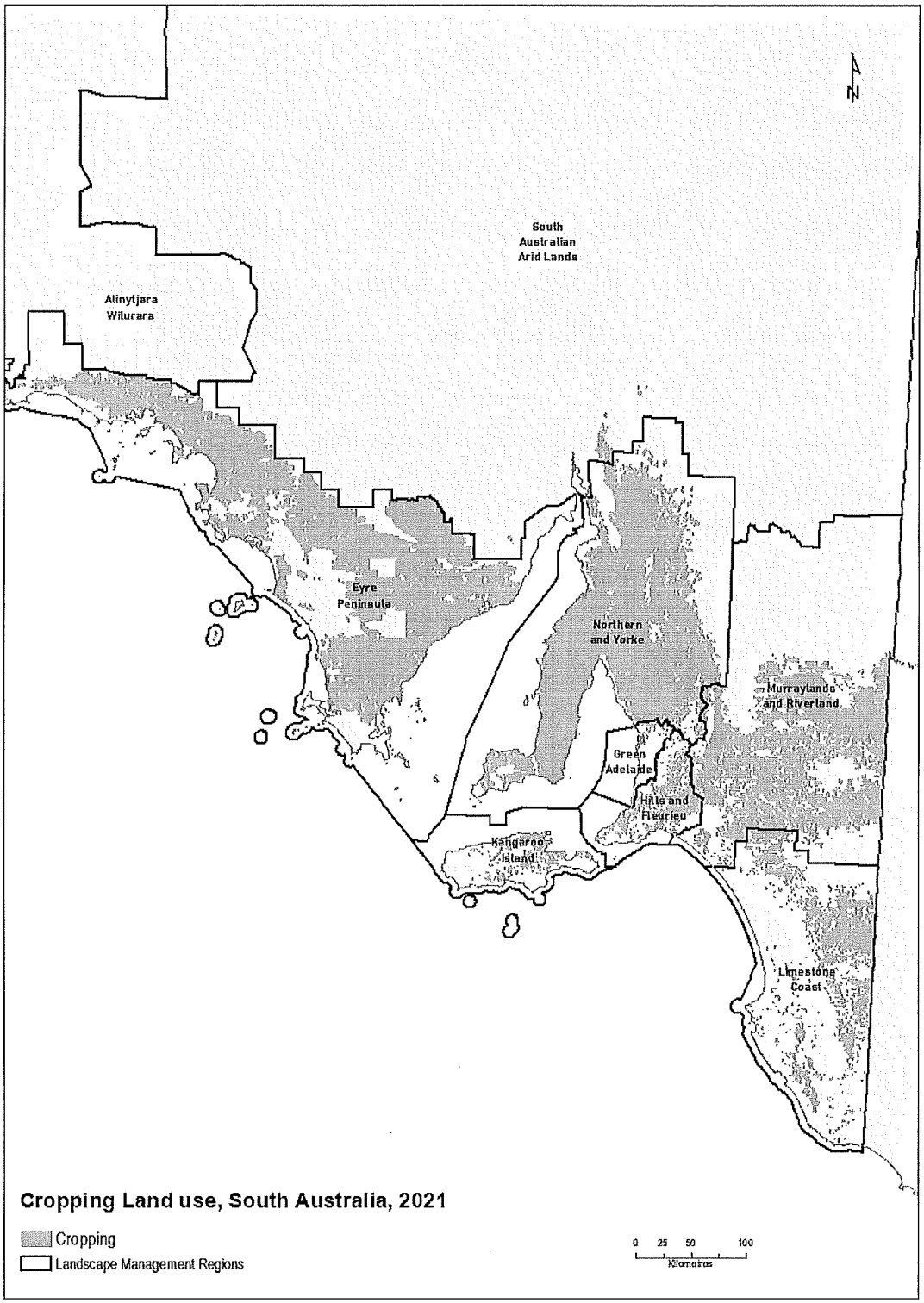
Source: PIRSA 2021

Appendix Figure 2-4 Sheep (wool)



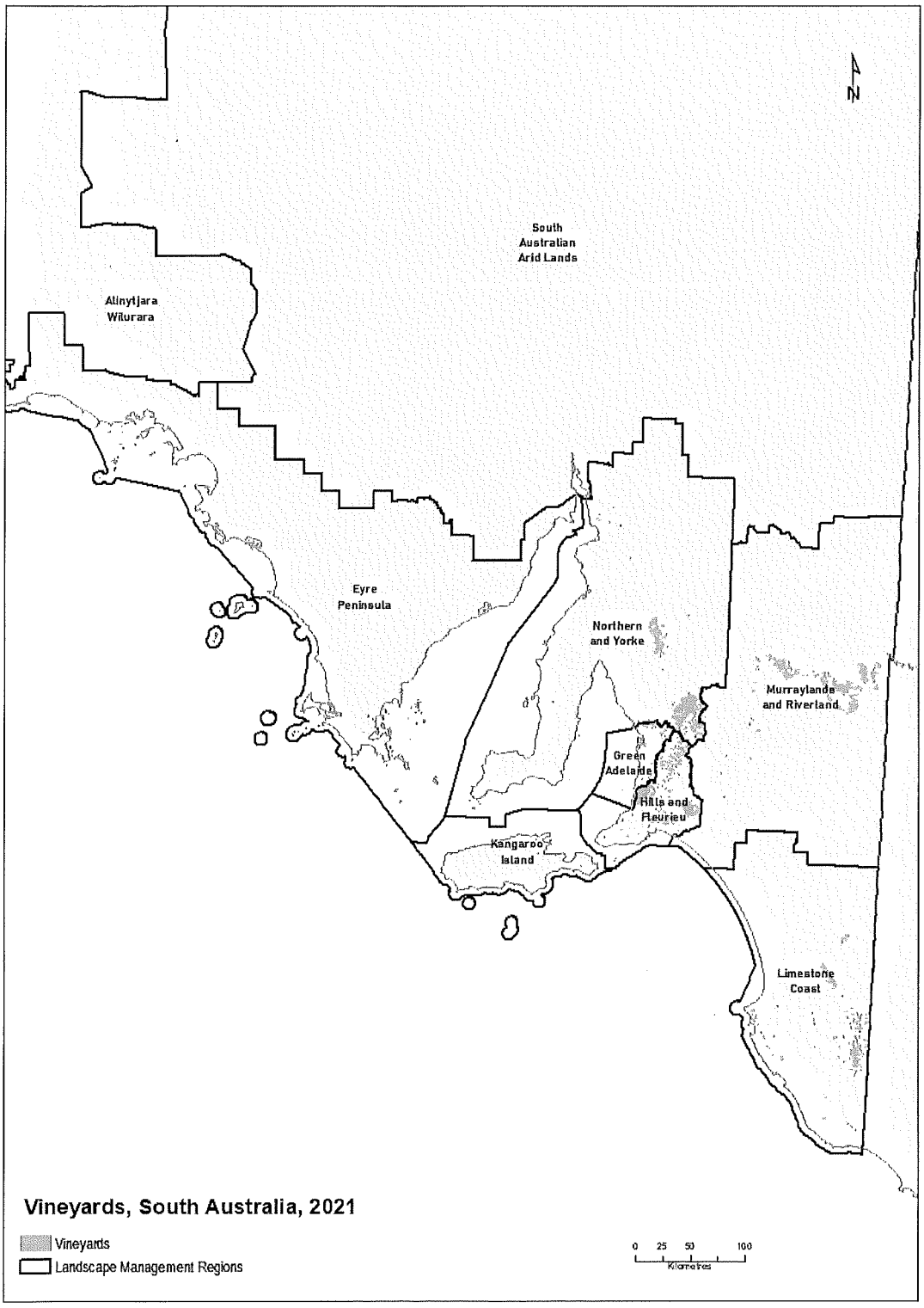
Source: PIRSA 2021

Appendix Figure 2-5 Cropping



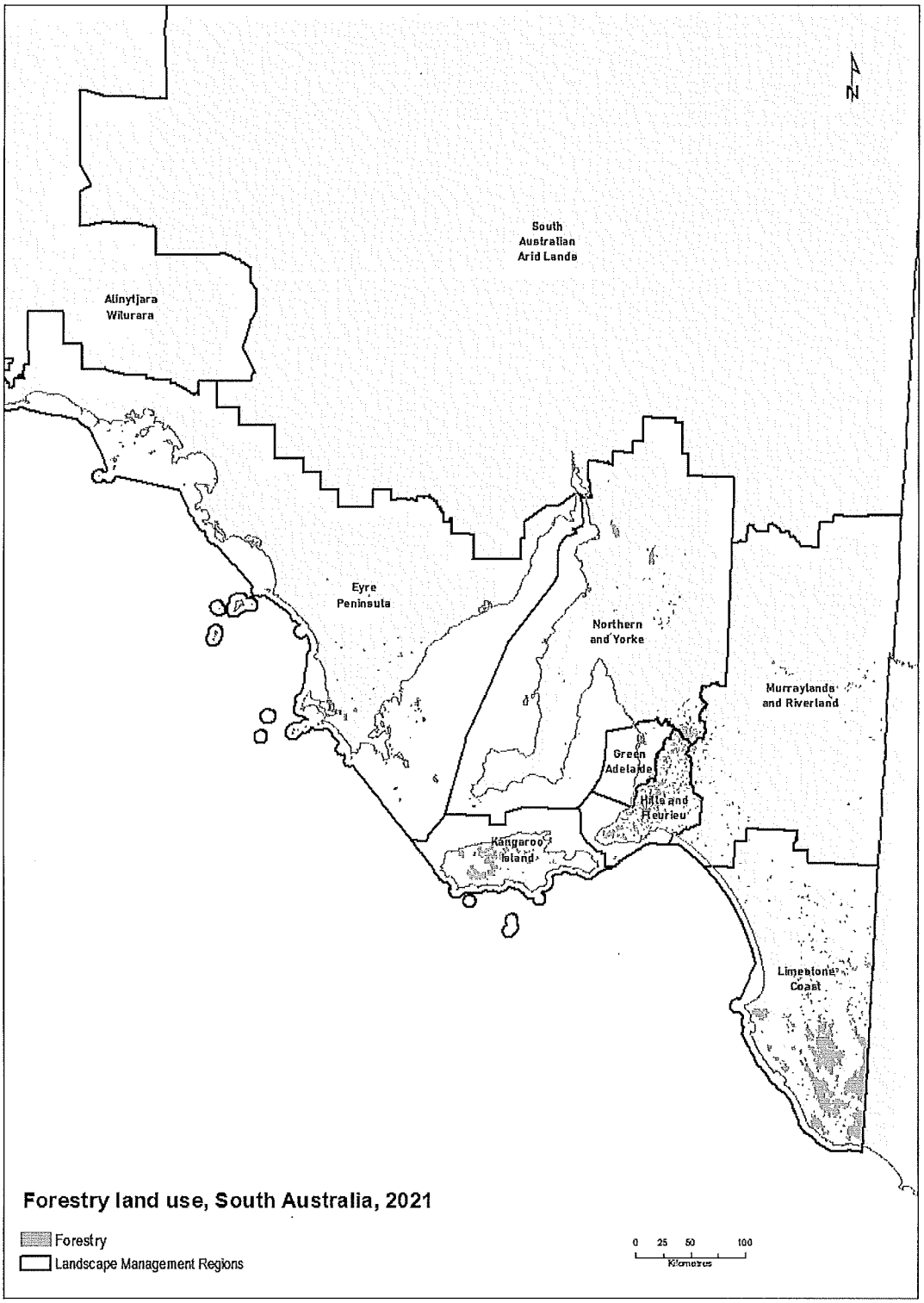
Source: PIRSA 2021

Appendix Figure 2-6 Winegrapes



Source: PIRSA 2021

Appendix Figure 2-7 Forestry



Source: PIRSA 2021

APPENDIX 3 Detailed Agriculture and Forestry Productivity Losses

Appendix Table 3-1 Productivity losses - beef

	Scenario 1 (business-as-usual)		Scenario 2 (eradication)	
Landscape Board Region	2021/22	2031/32	2021/22	2031/32
Alinytjara Wilurara	-	-	-	-
Eyre Peninsula	$5,000	$124,000	$5,000	-
Green Adelaide	$3,000	$60,000	$3,000	-
Hills & Fleurieu	$663,000	$2,743,000	$663,000	
Kangaroo Island	-	-	-	-
Limestone Coast	$3,153,000	$8,875,000	$3,153,000	$35,000
Murraylands & Riverland	$41,000	$1,853,000	$41,000	$7,000
Northern & Yorke	$179,000	$1,310,000	$179,000	$4,000
South Australian Arid Lands	$45,000	$4,091,000	$45,000	$38,000
Total	$4,089,000	$19,056,000	$4,089,000	$96,000

Source: PIRSA 2021

Appendix Table 3-2 Productivity losses - dairy

	Scenario 1 (business-as-usual)		Scenario 2 (eradication)	
Landscape Board Region	2021/22	2031/32	2021/22	2031/32
Alinytjara Wilurara	-	-	-	-
Eyre Peninsula	-	-	-	-
Green Adelaide	-	-	-	-
Hills & Fleurieu	$1,873,000	$7,749,000	$1,873,000	$34,000
Kangaroo Island	-	-	-	-
Limestone Coast	$514,000	$1,448,000	$514,000	$6,000
Murraylands & Riverland	$652,000	$29,185,000	$652,000	$104,000
Northern & Yorke	$182,000	$1,339,000	$182,000	$4,000
South Australian Arid Lands	-	-	-	-
Total	$3,221,000	$39,721,000	$3,221,000	$148,000

Source: PIRSA 2021

Appendix Table 3-3 Productivity losses - lamb

	Scenario 1 (business-as-usual)		Scenario 2 (eradication)	
Landscape Board Region	2021/22	2031/32	2021/22	2031/32
Alinytjara Wilurara	-	-	-	-
Eyre Peninsula	$30,000	$769,000	$30,000	$2,000
Green Adelaide	$1,000	$18,000	$1,000	-
Hills & Fleurieu	$136,000	$564,000	$136,000	$3,000
Kangaroo Island	-	-	-	-
Limestone Coast	$4,850,000	$13,654,000	$4,850,000	$53,000
Murraylands & Riverland	$23,000	$1,013,000	$23,000	$4,000
Northern & Yorke	$1,267,000	$9,299,000	$1,267,000	$31,000
South Australian Arid Lands	$10,000	$940,000	$10,000	$9,000
Total	$6,317,000	$26,257,000	$6,317,000	$102,000

Source: PIRSA 2021

Appendix Table 3-4 Productivity losses - wool

	Scenario 1 (business-as-usual)		Scenario 2 (eradication)	
Landscape Board Region	2021/22	2031/32	2021/22	2031/32
Alinytjara Wilurara	-	-	-	-
Eyre Peninsula	$29,000	$744,000	$29,000	$2,000
Green Adelaide	$1,000	$21,000	$1,000	-
Hills & Fleurieu	$127,000	$527,000	$127,000	$2,000
Kangaroo Island	-	-	-	-
Limestone Coast	$4,956,000	$13,951,000	$4,956,000	$55,000
Murraylands & Riverland	$29,000	$1,295,000	$29,000	$5,000
Northern & Yorke	$1,279,000	$9,382,000	$1,279,000	$31,000
South Australian Arid Lands	$12,000	$1,120,000	$12,000	$10,000
Total	$6,433,000	$27,040,000	$6,433,000	$105,000

Source: PIRSA 2021

Appendix Table 3-5 Productivity losses - cropping

Landscape Board Region	Scenario 1 (business-as-usual) 2021/22	Scenario 1 (business-as-usual) 2031/32	Scenario 2 (eradication) 2021/22	Scenario 2 (eradication) 2031/32
Alinytjara Wilurara	-	-	-	-
Eyre Peninsula	$243,000	$6,138,000	$243,000	$18,000
Green Adelaide	$28,000	$519,000	$28,000	$2,000
Hills & Fleurieu	$574,000	$2,373,000	$574,000	$11,000
Kangaroo Island	-	-	-	-
Limestone Coast	$753,000	$2,119,000	$753,000	$8,000
Murraylands & Riverland	$743,000	$33,268,000	$743,000	$119,000
Northern & Yorke	$3,295,000	$24,177,000	$3,295,000	$80,000
South Australian Arid Lands	-	-	-	-
Total	$5,636,000	$68,594,000	$5,636,000	$238,000

Source: PIRSA 2021

Appendix Table 3-6 Productivity losses - winegrapes

Landscape Board Region	Scenario 1 (business-as-usual) 2021/22	Scenario 1 (business-as-usual) 2031/32	Scenario 2 (eradication) 2021/22	Scenario 2 (eradication) 2031/32
Alinytjara Wilurara	-	-	-	-
Eyre Peninsula	-	-	-	-
Green Adelaide	$9,000	$166,000	$9,000	-
Hills & Fleurieu	$1,670,000	$6,908,000	$1,670,000	$31,000
Kangaroo Island	-	-	-	-
Limestone Coast	$424,000	$1,195,000	$424,000	$5,000
Murraylands & Riverland	$78,000	$3,481,000	$78,000	$12,000
Northern & Yorke	$5,801,000	$42,558,000	$5,801,000	$142,000
South Australian Arid Lands	-	-	-	-
Total	$7,982,000	$54,308,000	$7,982,000	$190,000

Source: PIRSA 2021

Appendix Table 3-7 Productivity losses - forestry

Landscape Board Region	Scenario 1 (business-as-usual) 2021/22	Scenario 1 (business-as-usual) 2031/32	Scenario 2 (eradication) 2021/22	Scenario 2 (eradication) 2031/32
Alinytjara Wilurara	-	-	-	-
Eyre Peninsula	-	-	-	-
Green Adelaide	-	$8,000	-	-
Hills & Fleurieu	$196,000	$810,000	$196,000	$4,000
Kangaroo Island	-	-	-	-
Limestone Coast	$2,125,000	$5,982,000	$2,125,000	$23,000
Murraylands & Riverland	-	-	-	-
Northern & Yorke	-	-	-	-
South Australian Arid Lands	-	-	-	-
Total	$2,321,000	$6,800,000	$2,321,000	$27,000

Source: PIRSA 2021

APPENDIX 4 Detailed CBA Model

Appendix Table 4-1 Detailed CBA model

	PV	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32
Scenario 1 - Base Case												
Benefits ($m[a])												
Enterprise Income (exc. Forestry)	52,119.4	6,308.3	6,351.6	6,394.9	6,438.2	6,481.5	6,524.8	6,568.1	6,611.4	6,654.7	6,698.0	6,741.2
Enterprise Income (Forestry only)	354.6	43.5	40.8	38.3	35.9	33.7	31.6	29.6	27.8	26.0	24.4	22.9
Total Benefits ($m[a])	52,473.9	6,351.8	6,392.4	6,433.2	6,474.1	6,515.2	6,556.4	6,597.7	6,639.2	6,680.7	6,722.4	6,764.1
Costs ($m[a])												
Government Control Costs	8.8	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Deer Traffic Collision Costs	3.5	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.7	0.8
Enterprise Variable Costs (exc. Forestry)	28,762.1	3,465.8	3,493.2	3,520.7	3,548.2	3,575.6	3,603.1	3,630.6	3,658.1	3,685.5	3,713.0	3,740.5
Enterprise Variable Costs (Forestry only)	211.7	26.0	24.4	22.9	21.4	20.1	18.9	17.7	16.6	15.6	14.6	13.7
Total Costs ($m[a])	28,986.2	3,493.0	3,518.9	3,544.9	3,571.1	3,597.3	3,623.6	3,649.9	3,676.4	3,702.9	3,729.4	3,756.1
Scenario 2 - Population Control												
Benefits ($m[a])												
Enterprise Income (exc. Forestry)	52,932.6	6,308.3	6,375.0	6,441.7	6,508.4	6,575.1	6,641.8	6,708.5	6,775.2	6,841.9	6,908.6	6,975.3
Enterprise Income (Forestry only)	357.5	43.5	40.9	38.4	36.1	33.9	31.9	30.0	28.2	26.4	24.8	23.3
Total Benefits ($m[a])	53,290.1	6,351.8	6,415.9	6,480.2	6,544.6	6,609.1	6,673.7	6,738.5	6,803.4	6,868.4	6,933.5	6,998.7
Costs ($m[a])												
Government Control Costs	11.9	4.4	2.7	1.5	1.2	0.8	0.6	0.6	0.6	0.5	0.5	0.5
Deer Traffic Collision Costs	0.7	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Enterprise Variable Costs (exc. Forestry)	29,058.6	3,465.8	3,501.8	3,537.8	3,573.8	3,609.8	3,645.8	3,681.8	3,717.8	3,753.8	3,789.8	3,825.8
Enterprise Variable Costs (Forestry only)	213.3	26.0	24.4	22.9	21.6	20.3	19.0	17.9	16.8	15.8	14.8	13.9
Total Costs ($m[a])	29,284.6	3,496.2	3,529.1	3,562.3	3,596.7	3,631.0	3,665.5	3,700.3	3,735.2	3,770.1	3,805.2	3,840.2
Incremental Benefits ($m[a])	816.2	0.0	23.5	47.0	70.4	93.9	117.4	140.8	164.2	187.7	211.1	234.5
Incremental Costs ($m[a])	298.4	3.3	10.1	17.4	25.6	33.7	41.9	50.4	58.9	67.2	75.7	84.2
Net Benefits (NPV) ($m[a])	517.8	-3.3	13.4	29.6	44.8	60.2	75.4	90.4	105.4	120.5	135.4	150.4
Benefit Cost Ratio (BCR)	**2.7**											
Internal Rate of Return (IRR)	**505%**											

[a] In 2021 dollars

Source: BDO EconSearch analysis

1300 138 991
www.bdo.com.au

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Hon Clare Scriven MLC
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Government of South Australia

DEPARTMENTAL WORKFLOW REQUEST

Department of Primary Industries and Regions (PIRSA)

Objective reference	eA197473
Title	Clause 6(1) Feral Deer on Fleurieu Peninsula
Due to Minister's Office	29 June 2022
Date requested	15 June 2022

Rationale

The Minister has received correspondence from Clause 6(1) regarding the management of feral deer on Fleurieu Peninsula on a farming property adjacent to Forestry SA sites.

Action Required

Could you please provide the following:

- Briefing and draft reply for the Minister's consideration

Thank you kindly.

Contact

Mark Smith	8226 3379

Government of South Australia
Department of Primary Industries and Regions

Minute to
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Ref: eA197473

For	**Noting** and **Signature**
Critical Date	**29 June 2022**
Subject	**Management of Feral Deer on Fleurieu Peninsula**

Synopsis

Clause 6(1) recently emailed you to highlight issues he is having with the increasing number of feral deer on the Fleurieu Peninsula. He also outlines issues with poachers illegally entering his property to hunt deer.

This briefing is to provide you with information on the current and planned management response to feral deer on the Fleurieu Peninsula, and to provide you with a draft letter of response to Clause 6(1).

Recommendations

That you:

1. Note the concerns raised by Clause 6(1) regarding feral deer numbers on the Fleurieu Peninsula, and management action being taken to resolve these issues.

   NOTED

2. Sign the draft response letter to Clause 6(1).

   SIGNED / NOT SIGNED

.....

Hon Clare Scriven MLC

Minister for Primary Industries and Regional Development

Minister for Forest Industries

/ / 2022

Ministerial Comments

Background

- Feral deer are a declared pest under the *Landscape South Australia Act 2019*, and land managers are required to remove them from their land. This is to protect primary industries, natural environment and road users from the impacts of feral deer.
- Feral deer numbers are increasing across agricultural parts of SA, with a current population of about 40,000.
- The Hills and Fleurieu region has the second highest population of feral deer in the state, estimated at about 8,000. Population modelling indicates that if no new action is taken, this population could increase to over 36,000 by 2032 (A5398868).
- The Parawa area on the Fleurieu is a hotspot for feral deer. The area has a mix of high productivity crops and pastures, as well as National Parks and ForestrySA.
- Intensive control programs are required to achieve substantial knockdowns of feral deer and reverse population growth.
- On 24 April 2022, you received an email from Clause 6(1) , highlighting his concern about the increasing numbers and impacts of feral deer on his dairy farm at Parawa, and the danger posed by illegal poaching.
- In recent years, Clause 6(1) upgraded his boundary fences in an effort to exclude feral deer and kangaroos. ForestrySA contributed to the cost of fencing, but it has not been effective at excluding deer.
- Clause 6(1) spends thousands of dollars per year on irrigation, fertiliser, electricity and diesel to produce high quality pasture, much of which is being eaten by feral deer.
- Clause 6(1) reports mobs of 40 to 60 feral deer enter his property each night from surrounding plantations and native forest reserves (both managed by ForestrySA).
- If commercial contractors shoot one or two of feral deer on Clause 6(1) property, the remaining feral deer quickly retreat to ForestrySA plantations.
- With Clause 6(1) help, SAPOL recently arrested an intoxicated poacher on Clause 6(1) Clause 6(1) property.
- Clause 6(1) is requesting helicopter culling be used to cull the feral deer. A thermal assisted aerial cull for feral deer in Clause 6(1) region was proposed for September 2021, but was cancelled due to concerns about the proximity to Normanville.
- Similar concerns about feral deer impacts were recently raised with you by Clause 6(1) Clause (eA197194), whose property is in the same area as Clause 6(1) .
- A response letter to Clause 6(1) (Attachment A) has been drafted for your consideration.

Discussion

Management of feral deer on the Fleurieu Peninsula

- The Hills and Fleurieu Landscape Board, ForestrySA, and the Yankalilla Council run a feral deer control program on the Fleurieu. Ground shooting is undertaken by professional shooters. Landholders in the Hay Flat area can participate at no cost.
- In addition, in June 2022, the Hills and Fleurieu Landscape Board and National Parks and Wildlife Service coordinated a June aerial cull over Deep Creek Conservation Park, during which they removed 243 feral deer.
- PIRSA is working with Landscape Boards, ForestrySA, SA Water and National Parks and Wildlife on the implementation of the feral deer eradication program in the Hills and Fleurieu region, including large scale aerial culling programs. These organisations are extremely supportive of the proposed program and have offered technical, logistical and administrative support.
- Extensive public engagement will be undertaken ahead of aerial culling programs to increase community awareness and support for the programs.

Illegal poaching of feral deer on the Fleurieu Peninsula

- Poaching of feral deer on the Fleurieu Peninsula is common. The large numbers of feral deer and the close proximity to Adelaide entice illegal hunters to this region.
- The Government of South Australia does not tolerate trespassing, poaching or unauthorised hunting.
- Offences related to the poaching of either farmed or feral deer include property damage and trespass, as well as offences under the *Firearms Act 2015*, the *National Parks and Wildlife Act 1972*, and the *Animal Welfare Act 1985*.
- Despite the potential for conviction and hefty penalties, prosecutions or expiations related to poaching are not common.
- Illegal hunting frightens and frustrates primary producers, who regularly endure high-powered firearms being discharged by unknown hunters on their properties at night.
- The eradication of feral deer in South Australia is the only way to mitigate the risk of poaching farmed or feral deer.

Stakeholder / regional impacts, consultation and engagement

- Eradication of feral deer from SA has strong support from primary industries, landscape boards, State and Commonwealth governments.
- The General Manager of the Hills and Fleurieu Landscape Board, Executive Director of National Parks and Wildlife and relevant staff from ForestrySA and SA Water reviewed drafts of this brief.

Management of key risks

- Feral deer impact a range of production industries and so the benefit of investment in eradication, including aerial control operations, is significant. Recent independent cost-benefit analysis showed the 10-year eradication program, costing $14 million, will generate a net benefit of $518 million over an 11-year period.

Attachments

A. Draft response letter to Clause 6(1)

CHIEF EXECUTIVE
Department of Primary Industries and Regions

28 /06 /2022

CONTACT	Nathan Rhodes
POSITION	Executive Director
DIVISION	Biosecurity
MOBILE and LANDLINE	0412 376 450
Cleared by	Brad Page

Document ID: eA197473

Government of South Australia

The Hon Clare Scriven MLC

Clause 6(1)

Email: Clause 6(1)

Dear Clause 6(1)

Thank you for your email of 13 June 2022 regarding feral deer at Parawa.

I share your concerns about the increasing number of feral deer across the state and their damaging impacts.

The Department of Primary Industries and Regions (PIRSA) and the Hills and Fleurieu Landscape Board (the Board) are developing a plan to work with National Parks, ForestrySA, SA Water and private landholders to eradicate feral deer from the Fleurieu Peninsula.

PIRSA will work with the Board to intensify control programs for feral deer in the Hills and Fleurieu region over the next four years, with a focus on thermal-assisted aerial culling of feral deer. Importantly, PIRSA and the Board will ensure all landholders are consulted and involved.

I recognise the danger posed by poachers entering your property illegally to shoot feral deer. The Government of South Australia does not tolerate trespassing, poaching or unauthorised hunting of feral deer. I encourage you to continue to report such incidents to South Australia Police.

Once again, thank you for writing to me on this important issue.

Yours sincerely

Hon Clare Scriven MLC
MINISTER FOR PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT
MINISTER FOR FOREST INDUSTRIES

/ / 2022

Minister for Primary Industries and Regional Development
Minister for Forest Industries

GPO Box 1671 Adelaide SA 5001
Telephone 08 8226 2931 | Email minister.scriven@sa.gov.au

SOUTH AUSTRALIA

Hon Clare Scriven MLC
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Government of South Australia

DEPARTMENTAL WORKFLOW REQUEST

Department of Primary Industries and Regions (PIRSA)

Objective reference	eA197154
Title	Feral Deer Management – Fleurieu Peninsula
Due to Minister's Office	17 May 2022
Date requested	27 April 2022

Rationale

The Minister has received correspondence from Clause 6(1) regarding the management of feral deer on the Fleurieu Peninsula.

Action Required

Could you please provide the following:

- Draft response for the Minister's consideration

Thank you kindly.

Contact

Mark Smith	8226 3379

Government of South Australia
Department of Primary Industries and Regions

Minute to
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Ref: A5419480

For	**Noting** and **Signature**
Critical Date	**25 May 2020**
Subject	**Feral Deer on Fleurieu Peninsula**

Synopsis

A member of the public, Clause 6(1), recently wrote to you to highlight issues he and his neighbours are having with the increasing number of feral deer on the Fleurieu Peninsula. This briefing is to provide you with an overview of the situation and management response to feral deer on the Fleurieu Peninsula, and to provide you with a draft letter of response to Clause 6(1) Clause 6(1).

Recommendations

That you:

1. Note the response to concerns raised by Clause 6(1) regarding feral deer numbers on the Fleurieu Peninsula.

   NOTED

2. Sign the draft response letter to Clause 6(1)

   SIGNED / NOT SIGNED

.....
Hon Clare Scriven MLC
Minister for Primary Industries and Regional Development
Minister for Forest Industries
/ / 2022

Ministerial Comments

Background

- Feral deer are a declared pest under the *Landscape South Australia Act 2019*, and land managers are required to remove them from their land. This is to protect our primary production industries, natural environment and road users from the impacts of feral deer.
- Feral deer numbers are rapidly increasing across agricultural parts of SA, with a current total population of about 40,000.
- You recently received a briefing outlining programs and opportunities to improve management of feral deer in SA, including funding you secured (4 years) and funding required (10 years) for the eradication of feral deer from the state (A5398868).
- The eradication of feral deer is a strategic priority for the Department of Primary Industries and Regions (PIRSA) and regional landscape boards; particularly in the Limestone Coast and Hills and Fleurieu regions, where impacts are highest.
- On 24 April 2022, you received an email fron Clause 6(1) , seeking to bring to your attention the increasing number and impact of feral deer on the Fleurieu Peninsula.

Discussion

Correspondence

- Clause 6(1) has a property at Hay Flat (near Yankalilla) and has observed significant destruction caused by feral deer to his and his neighbours' properties. The feral deer are damaging fences, infrastructure, trees, and plants.
- In his email to you Clause states that he feels overwhelmed by the problem and now sees his only course of action is to erect expensive deer-proof fencing, because he does not have the ability to control feral deer by shooting.
- Clause 6(1) has extended an invitation for you to visit his property.
- A response letter t Clause 6(1) (Attachment A) has been drafted for your consideration, including indicating acceptance of his offer to visit his property.

Management of feral deer on the Fleurieu Peninsula

- SA's feral deer population is small compared with other parts of Australia, but population projections indicate feral deer will number more than 200,000 in 10 years, even with current control programs.
- Of all of the Landscape regions, the Hills and Fleurieu region has the second highest population of feral deer in the state, at about 8,000. Models indicate that if no new action is taken, this population could increase to over 36,000 by 2032.
- Over the last 5 years, feral deer control programs led by the Hills and Fleurieu Landscape Board removed 1,489 feral deer.
- The Hills and Fleurieu Landscape Board, Forestry SA, and the Yankalilla Council run a feral deer control program on the Fleurieu. Shooting is undertaken by professional shooters. Landholders in the Hay Flat area can participate at no cost.
- Intensified control programs are required to achieve substantial knockdowns of feral deer and reverse population growth.
- PIRSA is coordinating the development of a draft State Feral Deer Strategy for SA. The Strategy outlines plans to eradicate deer from SA within 10 years. Thermal assisted aerial culling has been identified as a vital tool to achieving the goals of the Strategy on the Fleurieu Peninsula.

- In March 2021, a trial of thermal cameras in aerial operations, conducted at Second Valley, showed that feral deer use areas of dense vegetation, including forestry, as safe havens. The thermal cameras detect the body heat of the feral deer and were effective in detecting deer even in areas of dense vegetation (Attachment B).
- The first few years of the 10-year eradication program are expected to produce the largest reduction in feral deer populations, resulting in noticeable differences for producers, managers of conservation properties and owners of lifestyle blocks.

Farmer and Stakeholder impacts/ Regional Business and Stakeholder impacts

- Feral deer impact on a range of primary production types including cattle, sheep, cropping, viticulture, and forestry.
- Eradication of feral deer from SA has strong support from industry, landscape boards, state and Commonwealth governments.

Management of key risks

- Feral deer impact a range of production industries and so the benefit of investment in eradication, including aerial control operations, is expected to be significant. Recent independent cost-benefit analysis showed that the 10-year eradication program, costing $14 million, will generate a net benefit of $518 million over an 11-year period.

Consultation

- General Manager of the Hills and Fleurieu Landscape Board reviewed this brief.

Financial implications

- You recently executed an Agreement for $4 million in Commonwealth funding for 'Enhancing national pest animal and weed management' over four years (A5365693), $2 million of which will be used to cull feral deer.

Attachments

A. Draft response letter to Clause 6(1)
B. Youtube link – video showing difference in detectability of feral deer in dense vegetation using thermal technology vs. without thermal technology. https://www.youtube.com/watch?v=qIzrHETkgwc.

for

CHIEF EXECUTIVE
Department of Primary Industries and Regions

10/5/2022

CONTACT	Nathan Rhodes
POSITION	Executive Director
DIVISION	Biosecurity
MOBILE and LANDLINE	0412 376 450
PREPARED BY	Kate Fielder – Biosecurity Officer

eA197154

Government of South Australia

The Hon Clare Scriven MLC

Clause 6(1)

Email: Clause 6(1)

Dear Clause 6(1)

Thank you for your email of 24 April 2022 regarding the issue of feral deer on the Fleurieu Peninsula.

The Department of Primary Industries and Regions (PIRSA) and the Hills and Fleurieu Landscape Board are aware of the increasing number of feral deer across the state and their damaging impacts. PIRSA and the Board are developing a plan to work with National Parks, Forestry, and landholders to address the feral deer problem.

PIRSA will work with the Board to intensify control programs for feral deer in the Fleurieu region over the next four years, with a focus on thermal-assisted aerial culling. Importantly, PIRSA and the Board will ensure that all landholders can be involved.

I recognise that exclusion fencing, while it will stop feral deer from entering your property, is costly to build and maintain. With intensified control programs, feral deer numbers are expected to be noticeably reduced, not just in your area but across the state. This would negate the need to invest in deer-proof fences around your small block.

The Hills and Fleurieu Landscape Board has been coordinating an on-ground feral deer control program on the Fleurieu Peninsula since 2019. If you are interested in participating in this program, please call Mr Tom Kloeden at the Board 0412 701 569.

Finally, I thank you for your invitation to visit your property. I would very much like to see the impact of feral deer firsthand. My office will be in contact to arrange a suitable time.

Once again, thank you for writing to me on this important issue.

Yours sincerely

Hon Clare Scriven MLC
MINISTER FOR PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT
MINISTER FOR FOREST INDUSTRIES

/ / 2022

Minister for Primary Industries and Regional Development
Minister for Forest Industries

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Government of South Australia
Department of Primary Industries and Regions

MINISTER'S OFFICE
RECEIVED

Minute to
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Ref: A5419480

For	**Noting** and **Signature**
Critical Date	**25 May 2020**
Subject	**Feral Deer on Fleurieu Peninsula**

Synopsis

A member of the public, Clause 6(1), recently wrote to you to highlight issues he and his neighbours are having with the increasing number of feral deer on the Fleurieu Peninsula. This briefing is to provide you with an overview of the situation and management response to feral deer on the Fleurieu Peninsula, and to provide you with a draft letter of response to Clause 6(1) Clause 6(1).

Recommendations

That you:

1. Note the response to concerns raised by Clause 6(1) regarding feral deer numbers on the Fleurieu Peninsula.

   NOTED

2. Sign the draft response letter to Clause 6(1)

   SIGNED / NOT SIGNED

.....

Hon Clare Scriven MLC

Minister for Primary Industries and Regional Development

Minister for Forest Industries

/ / 2022

Ministerial Comments

Background

- Feral deer are a declared pest under the *Landscape South Australia Act 2019*, and land managers are required to remove them from their land. This is to protect our primary production industries, natural environment and road users from the impacts of feral deer.
- Feral deer numbers are rapidly increasing across agricultural parts of SA, with a current total population of about 40,000.
- You recently received a briefing outlining programs and opportunities to improve management of feral deer in SA, including funding you secured (4 years) and funding required (10 years) for the eradication of feral deer from the state (A5398868).
- The eradication of feral deer is a strategic priority for the Department of Primary Industries and Regions (PIRSA) and regional landscape boards; particularly in the Limestone Coast and Hills and Fleurieu regions, where impacts are highest.
- On 24 April 2022, you received an email from Clause 6(1), seeking to bring to your attention the increasing number and impact of feral deer on the Fleurieu Peninsula.

Discussion

Correspondence

Clause 6(1) has a property at Hay Flat (near Yankalilla) and has observed significant destruction caused by feral deer to his and his neighbours' properties. The feral deer are damaging fences, infrastructure, trees, and plants.

- In his email to you, Clause 6(1) states that he feels overwhelmed by the problem and now sees his only course of action is to erect expensive deer-proof fencing, because he does not have the ability to control feral deer by shooting.
- Clause 6(1) has extended an invitation for you to visit his property.
- A response letter to Clause 6(1) (Attachment A) has been drafted for your consideration, including indicating acceptance of his offer to visit his property.

Management of feral deer on the Fleurieu Peninsula

- SA's feral deer population is small compared with other parts of Australia, but population projections indicate feral deer will number more than 200,000 in 10 years, even with current control programs.
- Of all of the Landscape regions, the Hills and Fleurieu region has the second highest population of feral deer in the state, at about 8,000. Models indicate that if no new action is taken, this population could increase to over 36,000 by 2032.
- Over the last 5 years, feral deer control programs led by the Hills and Fleurieu Landscape Board removed 1,489 feral deer.
- The Hills and Fleurieu Landscape Board, Forestry SA, and the Yankalilla Council run a feral deer control program on the Fleurieu. Shooting is undertaken by professional shooters. Landholders in the Hay Flat area can participate at no cost.
- Intensified control programs are required to achieve substantial knockdowns of feral deer and reverse population growth.
- PIRSA is coordinating the development of a draft State Feral Deer Strategy for SA. The Strategy outlines plans to eradicate deer from SA within 10 years. Thermal assisted aerial culling has been identified as a vital tool to achieving the goals of the Strategy on the Fleurieu Peninsula.

- In March 2021, a trial of thermal cameras in aerial operations, conducted at Second Valley, showed that feral deer use areas of dense vegetation, including forestry, as safe havens. The thermal cameras detect the body heat of the feral deer and were effective in detecting deer even in areas of dense vegetation (Attachment B).
- The first few years of the 10-year eradication program are expected to produce the largest reduction in feral deer populations, resulting in noticeable differences for producers, managers of conservation properties and owners of lifestyle blocks.

Farmer and Stakeholder impacts/ Regional Business and Stakeholder impacts

- Feral deer impact on a range of primary production types including cattle, sheep, cropping, viticulture, and forestry.
- Eradication of feral deer from SA has strong support from industry, landscape boards, state and Commonwealth governments.

Management of key risks

- Feral deer impact a range of production industries and so the benefit of investment in eradication, including aerial control operations, is expected to be significant. Recent independent cost-benefit analysis showed that the 10-year eradication program, costing $14 million, will generate a net benefit of $518 million over an 11-year period.

Consultation

- General Manager of the Hills and Fleurieu Landscape Board reviewed this brief.

Financial implications

- You recently executed an Agreement for $4 million in Commonwealth funding for 'Enhancing national pest animal and weed management' over four years (A5365693), $2 million of which will be used to cull feral deer.

Attachments

A. Draft response letter to Clause 6(1)
B. Youtube link – video showing difference in detectability of feral deer in dense vegetation using thermal technology vs. without thermal technology. https://www.youtube.com/watch?v=qIzrHETkgwc.

for

CHIEF EXECUTIVE
Department of Primary Industries and Regions

10/5/2022

CONTACT	Nathan Rhodes
POSITION	Executive Director
DIVISION	Biosecurity
MOBILE and LANDLINE	0412 376 450
PREPARED BY	Kate Fielder – Biosecurity Officer

Government of South Australia
Department of Primary Industries and Regions

Minute to
Minister for Primary Industries and Regional Development

Ref:. A5365693

For	**Signature**
Critical Date	**14 April 2022, so Commonwealth has time to pay the first milestone before 30 June 2022**
Subject	**Commonwealth funding – enhancing national pest animal and weed management**

Synopsis

The Commonwealth Agriculture Minister Hon. David Littleproud MP wrote to the previous Minister for Primary Industries and Regional Development with a proposed *Federation Funding Agreement – Environment, for Enhancing National Pest Animal and Weed Management* (Attachments A and B).

This Minute recommends that you sign the Funding Agreement, to secure the $4 million Commonwealth funding over four years. Funding is to support eradication programs for wild dogs and feral deer, and for the control of priority weeds in South Australia.

Recommendations

That you:

1. Sign and return via email (pestanimals&weeds@agriculture.gov.au) the attached Funding Agreement (Attachment B) and response letter (Attachment C).

SIGNED / NOT SIGNED

.....

Hon Clare Scriven MLC

Minister for Primary Industries and Regional Development

/ / 2022

Ministerial Comments

Background

- The Commonwealth Agriculture Minister Hon. David Littleproud MP wrote to the previous Minister for Primary Industries and Regional Development on 22 March 2022 with a proposed Federation Funding Agreement – Environment, for Enhancing National Pest Animal and Weed Management (the Agreement; Attachment B).
- Funding is for on-ground activities to combat established pest animals and weeds.

Discussion

- The Agreement will provide $4 million of Commonwealth funding over four years.
- This funding will support the activities to be carried out by PIRSA, in partnership with Landscape Boards, under the Agreement are:
    - The eradication of feral deer from SA ($2,000,000)
    - Out of scope
    -
- In January 2022, the previous government committed funding of $1.5 million to these projects over four years. In addition, PIRSA and Landscape Boards (landscape levies and Landscape Priority Funds) committed $2.5 million over four years.
- Additional co-investment totalling more than $2 million over four years is through industry (Meat and Livestock Australia, Australian Wool Innovation, SA Sheep Industry Fund).
- The projects will be delivered by PIRSA through the Biosecurity Division, in partnership with Landscape Boards and the Department for Environment, Water and Climate.

Farmer and Stakeholder impacts/ Regional Business and Stakeholder impacts

- The proposed programs address key priorities of SA industry groups, and capitalise on large scale investments into pest management programs. This includes the $25 million rebuild of the Dog Fence and on-going maintenance of it, 15 years of aerial control of feral deer, Out of scope
Out of scope

Consultation and engagement

- The Department for Environment, Water and Climate and regional landscape boards were consulted during the development of the projects.

Financial implications

- The Commonwealth Government will provide PIRSA with $4 million over four years to support eradication programs for wild dogs and feral deer, and for the control of priority weeds in South Australia.
- Proposed scheduling of the payment of funds to PIRSA is detailed below.

Project Name	20 May 2022	21 April 2023	19 April 2024	April/May 2025	Total
Eradication of feral deer from South Australia	$400,000	$700,000	$500,000	$400,000	$2,000,000

Out of scope

Attachments

A. Letter from the Hon David Littleproud MP offering the funding.
B. Federation Funding Agreement – Environment, for Enhancing National Pest Animal and Weed Management, signed by the Hon David Littleproud MP (signature required on page 6)
C. Response letter to the Hon David Littleproud MP

CHIEF EXECUTIVE
Primary Industries and Regions SA

6/4/2022

CONTACT	Nathan Rhodes
POSITION	Executive Director
DIVISION	Biosecurity
MOBILE and LANDLINE	0412 376 450 and 8429 3135
PREPARED BY	Giverny Rodgers

The Hon David Littleproud MP

Minister for Agriculture and Northern Australia
Deputy Leader of the Nationals
Federal Member for Maranoa

Ref: MS22-000234

22 MAR 2022

The Hon David Basham MP
Minister for Primary Industries and Regional Development
GPO Box 1671
ADELAIDE SA 5001

Via email: minister.basham@sa.gov.au

Dear Minister

I wrote to you in August 2021, identifying an opportunity for on-ground pest and weed activities through the Supporting Communities Manage Pest Animals and Weeds Program.

The Hon Sussan LeyMP, Minister for the Environment and I, are pleased to offer you for signing, the enclosed schedule to the Federation Funding Agreement – Environment, for *Enhancing national pest animal and weed management* formalising support for a total of $4,000,000 (GST not applicable) over the next four years for the projects:

- Eradication of feral deer from South Australia
- Eradication of wild dogs from SA sheep country
- Priority weed control programs

This funding will support South Australia to continue efforts to deliver better solutions to combat established pest animals and weeds posing a significant threat to Australian primary production, the environment and Australia's biodiversity.

As initial payments are scheduled for April/May 2022, a response at your earliest convenience would be greatly appreciated. Once signed, an electronic copy of the schedule can be returned to pestanimals&weeds@agriculture.gov.au.

We look forward to working together through this program.

Yours sincerely

DAVID LITTLEPROUD MP

Enc

cc The Hon Sussan Ley MP, Minister for the Environment

Enhancing National Pest Animal and Weed Management

FEDERATION FUNDING AGREEMENT - ENVIRONMENT

Table 1: Formalities and operation of schedule	
Parties	Commonwealth New South Wales Queensland Victoria South Australia Tasmania Western Australia the Northern Territory the Australian Capital Territory
Duration	This Schedule is expected to expire on 30 December 2025.
Purpose	This Schedule will support the delivery of projects approved through two tranches (June 2021 and March 2022) to help land managers, the community and industry to better manage established pest animals and weeds. Projects focus on: • improving the management of established pest (including feral) animal and weed species of national significance that have a detrimental effect on Australia's agricultural competitiveness, the environment and are in the national interest to manage. • Reducing the incidence, distribution and impact of established pest animal and weed species.

Estimated financial contributions	The Commonwealth will provide an estimated total financial contribution to the States of $25.0 million ($5 million for tranche 1 and $20 million for tranche 2) in respect of this Schedule. States are expected to provide in-kind contributions for tranche 1 and cash and in-kind contributions for tranche 2.

Table 1 - $5 million Tranche 1

($ million)	2020-21	2021-22	2022-23	Total
Estimated total budget	**2.04**	**5.44**	**5.49**	**12.98**
Less estimated National Partnership Payments	1.60	1.50	1.90	4.99
- New South Wales	0.30	0.28	0.35	0.93
- Queensland	0.32	0.30	0.38	1.00
- Victoria	0.28	0.26	0.33	0.88
- South Australia	0.24	0.22	0.28	0.74
- Tasmania	0.16	0.15	0.19	0.50
- Western Australia	0.14	0.13	0.17	0.45
- Northern Territory	0.16	0.15	0.19	0.50
Balance of non-Commonwealth contributions	0.45	3.95	3.59	7.99
- New South Wales	0.21	0.64	0.40	1.25
- Queensland	0.00	0.42	0.51	0.93
- Victoria	0.04	0.26	0.22	0.51
- South Australia	0.17	1.99	1.87	4.02
- Tasmania	0.01	0.14	0.14	0.29
- Western Australia	0.00	0.25	0.25	0.51
- Northern Territory	0.03	0.25	0.21	0.49

Table 2 - $20 million Tranche 2 ($ million)	2021-22	2022-23	2023-24	2024-25	Total
Estimated total budget	**14.76**	**18.68**	**16.71**	**15.64**	**65.79**
Less estimated National Partnership Payments	4.00	6.00	5.00	5.00	20.00
- New South Wales	0.76	0.95	0.92	0.86	3.48
- Queensland	0.36	0.69	0.67	0.50	2.22
- Victoria	0.80	1.58	1.13	1.30	4.81
- South Australia	1.04	1.06	1.00	0.90	4.00
- Tasmania	0.00	0.56	0.51	0.51	1.58
- Western Australia	0.60	0.43	0.05	0.42	1.49
- Northern Territory	0.19	0.48	0.48	0.27	1.42
- Australian Capital Territory	0.25	0.25	0.25	0.25	1.00
Balance of non-Commonwealth contributions	10.76	12.68	11.71	10.64	45.79
- New South Wales	0.28	1.07	1.03	0.63	3.01
- Queensland	0.58	1.55	1.58	1.21	4.92
- Victoria	4.29	2.46	2.35	2.08	11.18
- South Australia	1.8	2.30	1.63	1.48	7.20
- Tasmania	0.00	0.61	0.54	0.54	1.70
- Western Australia	1.04	1.13	1.13	1.13	4.44
- Northern Territory	0.47	1.25	1.15	1.27	4.14
- Australian Capital Territory	2.30	2.30	2.30	2.30	9.20

[Additional terms]	

Table 3D: South Australia – Performance requirements, reporting and payment summary

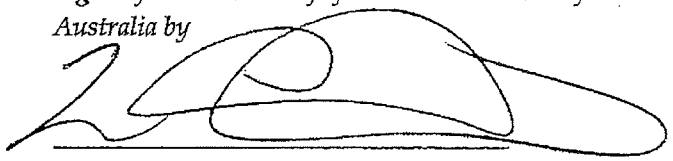
Tranche 1 - Output	Performance milestones	Report due	Payment
Cosigned schedule and high-level work plan - *Coordinated control of established pest animals and unpalatable perennial grasses through community-led action*	Exchange of FFA Schedule and provision of high-level activity work plan.	7/06/2021	$160,000
Cosigned schedule and high-level work plan – *Coordinated capacity building for Aboriginal Land Managers to control Weeds of National Significance and other high priority established weeds*	Exchange of FFA Schedule and provision of high-level activity work plan.	7/06/2021	$76,800
Coordinated control of established pest animals and unpalatable perennial grasses through community-led action • Support the development of two SA state coordinator roles for: o priority pest animals (rabbits, deer, and foxes) and, o weeds (unpalatable perennial grasses)	Submission of progress report detailing outcomes including: • Appointment of two coordinators • Outcomes from formal training in pest animals and weed management practices with stakeholders • Outcomes from workshops on integrated, best practice pest and weed control demonstrating new and emerging control tools • Outcomes from coordinated pest and weed control activities within and among landholder groups • Development of best practice management resources at various operational scales to increase the capacity of landholders to control pests and weeds	30/04/2022	$150,000
Coordinated capacity building for Aboriginal Land Managers to control Weeds of National Significance and other high priority established weeds • Create opportunities for Aboriginal people in primary industries and regional development, to manage Weeds of National Significance (WoNS) while aligning biosecurity outcomes to local community needs	Submission of progress report detailing outcomes including: • Increased participation in weed surveillance by Aboriginal communities • Outcomes from public forums and other consultation • Progress on reducing the impact from athel pine, opuntioid cacti, and African boxthorn on primary production/ infrastructure and biodiversity on Aboriginal lands • Outcomes from landscape scale pathway analysis to assess risks of weed invasion from other regions or states • Progress on decreasing the size and density of key weed infestations thereby improving amenity value and carrying capacity of Aboriginal lands • Outcomes from the provision of training in safe use of chemicals including personal protective equipment (PPE) and work health and safety (WHS).	30/04/2022	$72,000

Tranche 1 - Output	Performance milestones	Report due	Payment
Final report - *Coordinated control of established pest animals and unpalatable perennial grasses through community-led action*	Submission of final report detailing outcomes of the above	30/04/2023	$190,000
Final report - *Coordinated capacity building for Aboriginal Land Managers to control Weeds of National Significance and other high priority established weeds*	Submission of final report detailing outcomes of the above	30/04/2023	$91,200

Tranche 2 - Output	Performance milestones	Due	Payment
Cosigned schedule and high-level activity work plan – Eradication *of feral deer from South Australia*	Exchange of FFA Schedule and acceptance of high-level activity work plan.	20 May 2022	$400,000
Cosigned schedule and high-level activity work plan – Eradication *of wild dogs from SA sheep country*	Exchange of FFA Schedule and acceptance of high-level activity work plan.	20 May 2022	$441,890
Cosigned schedule and high-level activity work plan – Priority *weed control programs*	Exchange of FFA Schedule and acceptance of high-level activity work plan.	20 May 2022	$200,000
Eradication of feral deer from South Australia – Progress Report 1	Submission of Progress Report 1 detailing outcomes consistent with activity work plan	21 April 2023	$700,000
Eradication of wild dogs from SA sheep country – Progress Report 1	Submission of Progress Report 1 detailing outcomes consistent with activity work plan	21 April 2023	$158,110
Priority weed control programs – Progress Report 1	Submission of Progress Report 1 detailing outcomes consistent with activity work plan	21 April 2023	$200,000
Eradication of feral deer from South Australia – Progress Report 2	Submission of Progress Report 2 detailing outcomes consistent with activity work plan	19 April 2024	$500,000
Eradication of wild dogs from SA sheep country – Progress Report 2	Submission of Progress Report 2 detailing outcomes consistent with activity work plan	19 April 2024	$300,000
Priority weed control programs – Progress Report 2	Submission of Progress Report 2 detailing outcomes consistent with activity work plan	19 April 2024	$200,000
Final report - *Eradication of feral deer from South Australia*	Submission of final report detailing outcomes consistent with activity work plan	19 April 2025	$400,000
Final report - *Eradication of wild dogs from SA sheep country*	Submission of final report detailing outcomes consistent with activity work plan	9 May 2025	$300,000
Final Report - *Priority weed control programs*	Submission of final report detailing outcomes consistent with activity work plan	9 May 2025	$200,000

The Parties have confirmed their commitment to this schedule as follows:

***Signed** for and on behalf of the Commonwealth of Australia by*



The Honourable David Littleproud MP
Minister for Agriculture, Drought and Emergency Management

22 march 2022

***Signed** for and on behalf of the State of South Australia by*

Minister for Primary Industries and Regional Development

2022

Government
of South Australia

A5397786

Hon David Littleproud MP
Minister for Agriculture, Food and Fisheries
PO Box 6022
House of Representatives
Parliament House
CANBERRA ACT 2600

via email: pestanimals&weeds@agriculture.gov.au

Dear Minister

Thank you for your letter of 22 March 2022 to my predecessor, offering funding over the next four years under Table 3D of the Federation Funding Agreement - Environment for *enhancing national pest animal and weed management.*

Please find attached a signed and dated copy of the Agreement.

I welcome this initiative, supporting the delivery of coordinated management programs to combat priority established pest animals and weeds, to reduce impacts on current and future agricultural production and the environment in South Australia.

This initiative will also be welcomed by regional communities in South Australia.

Yours sincerely

Hon Clare Scriven MLC
MINISTER FOR PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT

/ 04 / 2022

SOUTH
AUSTRALIA

Hon Clare Scriven MLC
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Government of South Australia

DEPARTMENTAL WORKFLOW REQUEST

Department of Primary Industries and Regions (PIRSA)

Objective reference	eA197875
Title	Catherine Hutchesson MP Member for Waite Constituent Enquiry Clause 6(1) – Feral Deer
Due to Minister's Office	30 August 2022
Date requested	16 August 2022

Rationale

The Minister has received correspondence from the office of Clause 6(1), the Clause 6(1) on behalf of Clause 6(1) constituent Clause 6(1) regarding feral deer management.

Action Required

Could you please provide the following:

- Briefing and draft reply for the Minister's consideration

Thank you kindly.

Contact

Mark Smith	8226 3379

Government of South Australia
Department of Primary Industries and Regions

Minute to
Minister for Primary Industries and Regional Development

cc: Minister for Climate, Environment and Water

MINISTER'S OFFICE
12 APR 2022
eA1497063
RECEIVED

Ref: A5398868

For	**Noting**
Critical Date	Routine
Subject	**Feral deer management in South Australia**

Synopsis

This briefing is to provide you with an overview of programs and opportunities to improve management of feral deer in SA, including funding secured and required for the eradication of feral deer from the state.

Recommendations

That you:

1. Note the brief on programs and opportunities for feral deer management in SA.

NOTED

C.M. Scriven

Hon Clare Scriven MLC
Minister for Primary Industries and Regional Development
3/7/2022

Ministerial Comments -

- Population scenario modelling undertaken by PIRSA indicates that eradication of feral deer in SA is feasible within 10 years. To achieve this, coordinated and intensive ground and aerial control programs on public and private properties are needed, alongside the implementation of new and innovative control tools.
- PIRSA is also leading the development of these new control tools, with program funded by the Centre for Invasive Species developing both a new toxic bait for feral deer, and a deer-specific feeder to prevent access by native animals.
- Given new commitments to feral deer control in SA, an opportunity exists to develop a new strategy to inform the delivery of management priorities.
- PIRSA is also finalising the feral deer management strategy, which will be supported by recently-completed independent economic analysis of feral deer control options.

Economic Analysis

- Anticipating the need to put forward a business case for a feral deer eradication program in SA, Livestock SA, regional landscape boards and PIRSA requested an independent cost benefit analysis of feral deer control scenarios in South Australia (Attachment A).
- The economic analyses determined the net benefit of investing in a 10-year, $14 million feral deer control program in SA. The "eradication" scenario was compared against an ongoing "business-as-usual" scenario, based on historical levels of investment in feral deer culling.
- The business-as-usual scenario is expected in result in significant costs to landholders across a range of primary production types, through direct consumption of product, damage or contamination of product, or through competition with livestock for resources. Under the business-as-usual scenario, production losses are expected to increase from an estimated $36 million in 2020/21 to $242 million by 2031.
- The results of the cost benefit analysis indicate that the area-wide eradication program is a worthwhile investment. The net present value of $517.8 million indicates that, relative to business-as-usual, the eradication program will generate a net benefit to the community of $517.8 million over an 11-year period. The decision is considered to be worthwhile if the net present value is greater than zero.

National Feral Deer Coordinator

- State and National coordinator roles will support feral deer control programs in SA, with both roles being Commonwealth-funded, and based in PIRSA.
- These roles facilitate coordinated control of feral deer, build capacity, and establish links between farmers, commercial harvesters, and processors.
- PIRSA benefits from hosting the National Feral Deer Coordinator, for example by ensuring that SA priorities, particularly the development and trial of new control tools, are represented in the national approach, which guides Commonwealth funding priorities. SA also benefits from collaborations with other states.

Trial of thermal-assisted aerial culling for feral deer in SA

- As a part of the Commonwealth-funded National Feral Deer Management Program, PIRSA led a trial of thermal-assisted aerial culling (TAAC) of feral deer in the Limestone Coast region in September 2021.

Management of key risks

- Feral deer impact a range of production industries and so the benefit of investment in eradication is significant, compared with the overall program cost.

Attachments

A: Feral Deer Control Economic Analysis

for

CHIEF EXECUTIVE
Department of Primary Industries and Regions

12/4/2022

CONTACT	Nathan Rhodes
POSITION	Executive Director
DIVISION	Biosecurity
MOBILE and LANDLINE	0412376450
PREPARED BY	Giverny Rodgers

Hon Clare Scriven MLC
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Government of South Australia

DEPARTMENTAL WORKFLOW REQUEST

Department of Primary Industries and Regions (PIRSA)

Objective reference	eA197074
Title	Feral deer management program
Due to Minister's Office	3 May 2022
Date requested	19 April 2022

Rationale

The Minister has been asked a range of questions on the State Government's management of feral deer including deer on Forestry SA sites.

Action Required

Could you please provide the following:

- Briefing for the Minister's consideration on the feral deer management program
- Draft letter of reply for the Minister's signature

Thank you kindly.

Contact

Mark Smith	8226 3379

Government of South Australia
Department of Primary Industries and Regions

Minute to
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Ref: eA197074

For	**Approval and Signing**
Critical Date	**ASAP**
Subject	**Concerns over aerial shooting of feral deer**

Synopsis

A member of the public wrote to you apparently using a pseudonym, calling for a stop to aerial control of feral deer in SA. Recreational deer hunters commonly provide this feedback, believing that they should be used to cull deer. This briefing is to provide you with an overview of feral deer management in SA with respect to issues raised in the email, and a draft response letter.

Recommendations

That you:

1. Note the responses to concerns raised by Clause 6(1) regarding aerial culling of feral deer.

   NOTED

2. Sign the response letter to Clause 6(1) (Attachment A).

   SIGNED / NOT SIGNED

3. Consider attending a community meeting on the management of feral deer on the Limestone Coast, in Kingston on Wednesday 27 April at 5:30 pm.

   APPROVED / NOT APPROVED

.....

Hon Clare Scriven MLC

Minister for Primary Industries and Regional Development

Minister for Forests Industries

/ / 2022

Ministerial Comments

Background

Management of feral deer in SA

- Feral deer are a declared pest under the *Landscape South Australia Act 2019*, and land managers are required to remove them from their land. This is to protect our primary production industries, natural environment and road users from the impacts of feral deer. These include negative impacts of grazing on agriculture and native plants, as well as safety hazards.
- South Australia has an integrated approach to feral pest control, with feral deer culling methods focused on a combination of aerial and ground based shooting.
- Feral deer numbers are rapidly increasing across agricultural parts of SA, with a current estimated population of 40,000.
- SA's feral deer population is small compared with other parts of Australia, but population projections indicate feral deer will number more than 200,000 in 10 years, even with current control programs.
- A recent independent cost-benefit analysis of feral deer control found that under current control programs, production losses are expected to increase from an estimated $36 million in 2020/21 to $242 million by 2031.
- Intensified control programs are required to achieve substantial knockdowns of feral deer numbers, to both prevent the population growth seen in the eastern states of Australia and to get numbers of feral deer back to levels farmer can manage.
- The eradication of feral deer is a strategic priority for PIRSA and regional landscape boards; particularly in the Limestone Coast and Hills and Fleurieu regions, where impacts are highest. The recently revised State Feral Deer Policy supports this priority by requiring landholders to destroy all feral deer on their properties.
- Recreational deer hunters can continue to pursue their hobby, but they will need to invest in raising, managing and containing their deer, rather than capitalising on feral deer, which feed on the valuable pasture and crops of neighbouring farmers.
- You recently received a briefing recommending execution of a Funding Agreement to secure $4 million in Commonwealth funding for '*Enhancing national pest animal and weed management*' over four years (A5365693). This funding already forms part of approved budgets across forward estimates and will enable the eradication program to make significant inroads into numbers of feral deer.

Discussion

Correspondence

- On 13 April 2022, you received an email from Clause 6(1), calling for a stop to aerial control of feral deer in South Australia, and alleging that the Department of Primary Industries and Regions (PIRSA) aerial control programs have involved firearm offences. The email was also sent to other politicians, media, shooting organisations, government and non-government organisations.
- The Advertiser sought a response to the email from PIRSA. PIRSA coordinated the response with input from the Limestone Coast and Hills and Fleurieu Landscape Boards, and the Department of Environment and Water. These agencies have conducted aerial control programs of feral deer for several years.

- Clause 6(1) claimed to represent the views of Sporting Shooters Association of Australia (SSAA) members, complaining that aerial controls are operating during "peak hunting period", and that they pose a safety risk to hunters and the public.
- PIRSA staff tried to contact Clause 6(1) to discuss the allegations to no avail. Neither the Sporting Shooters Association of Australia nor the Australian Deer Association have any record of this person, and so it is likely a disgruntled recreational deer hunter, advocating to stop very effective aerial control programs in South Australia.
- Clause 6(1) email is consistent with previous correspondence from recreational deer hunters across Australia, who seek to protect their hobby.
- The motivations of recreational hunters are for sport and enjoyment, to select the best trophy (antlers of male deer), or source enough meat their consumption (typically 1-2 deer).
- Hunting for these recreational purposes is not sufficient to provide control of feral deer. Effective pest control would require orders of magnitude more deer being culled by recreational hunters and would require that they target female rather than male deer and that they not stop hunting once they have harvested enough meat.
- Effective pest control works to remove a proportion of feral deer (requiring the removal of at least 35 per cent per year to counter their natural rate of reproduction), focusing on females to reduce population growth and impacts. Recreational shooting does not achieve pest control.
- On 14 April, the Advertiser printed a story highlighting that the SSAA refuted the claims of Clause 6(1) , stating that his email does not reflect the views of the SSAA. SSAA were quoted supporting aerial control programs for feral deer and work collaboratively with state government operations.
- The claims made by Clause 6(1) in his email are baseless. The claims are made with the express intent of putting pressure on government to cease aerial culling programs.
- A response letter to Clause 6(1) (Attachment A) has been drafted for your consideration.

<u>Aerial culling – safety and procedures</u>

- In his email, Clause made significant claims regarding the safety and humaneness of aerial culling. Strict standards are applied to aerial cull operations carried out by PIRSA, Landscape Boards and the Department for Environment and Water, to ensure public safety, livestock safety and humaneness.
- Prior to any aerial control of pest animals, government staff obtain approval from land managers where the culling will occur. By doing so, farmers are able to ensure all people and livestock are safe. Aerial shooting only occurs on properties where landholders have given prior approval.
- Aerial shooting teams comprise of expert, trained, accredited and professional pilots and marksmen.
- Low flying is permitted under Civil Aviation Safety Authority regulations, with all team members possessing the required licences, accreditation, landholder permissions and following requisite flight procedures and risk assessments.
- If during an aerial cull the helicopter needs to transit across properties which are not involved in the program, it first ascends to higher elevations.

- Strict plans and procedures are in place to ensure feral deer are humanely culled. No animals are left injured, with a requirement for a minimum of two shots per feral deer, and a deliberate fly-back procedure to confirm death.

Limestone Coast community meeting on the management of feral deer

- The Limestone Coast Landscape Board will host a community meeting in Kingston, on Wednesday 27 April from 5:30 pm to 6:30 pm, at which many landholders affected by feral deer will attend. These landholders have been proactively working with staff from PIRSA and the Landscape Board to control feral deer.
- The meeting will cover issues related to coordinated control of feral deer in the region, as well as implementation of the new South East Pest Management Strategy. Landholders will be seeking to maximise opportunities and efficiencies in work with the landscape board and PIRSA to achieve value for money from management programs.
- Attending this meeting would provide you an opportunity to join Landscape SA and PIRSA staff to hear community views on feral deer issues. There will also be the chance to discuss government priorities and opportunities related to pest control in the Limestone Coast region.
- Should you wish to attend the meeting, PIRSA staff will be available on either 26 April, and/or immediately before the meeting to brief you on pest management relevant to the Limestone Coast.

Farmer and Stakeholder impacts/ Regional Business and Stakeholder impacts

- Feral deer impact on a range of primary production types including cattle, sheep, cropping, viticulture, and forestry.
- Eradication, including aerial control, of feral deer from SA has strong support from industry, landscape boards (Limestone Coast, Hills and Fleurieu, Northern and Yorke and Eyre Peninsula), state and Commonwealth governments, and the National Feral Deer Coordinator.

Management of key risks

- Feral deer impact a range of production industries and so the benefit of investment in eradication, including aerial control operations, is expected to be significant. A recent independent cost-benefit analysis showed that a proposed 10-year eradication program, budgeted at $14 million, will generate a net benefit to the community of $518 million over an 11-year period.
- Aerial control is the primary tool to achieve eradication, alongside new and innovative control tools (highlighted in previous briefing A5398868). Ground control alone cannot be sufficient.
- Recreational deer hunters will continue to advocate for the government cease aerial culling programs. The benefits of a deer eradication program, and the positive feedback from farmers, far outweigh negative attention from recreational hunters. The support from SMAA and positive spin of the Advertiser article already reflect this.

Consultation and engagement

- The Limestone Coast Landscape Board, Hills and Fleurieu Landscape Board and the Department for Environment and Water contributed to the response to the Advertiser addressing Clause 6(1) concerns.

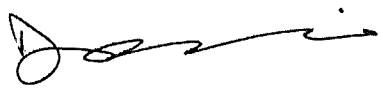
- The Department for Environment and Water and the Limestone Coast Landscape Board General Manager reviewed a draft version of this brief.

Financial implications

- None

Attachments

A. Response letter to Clause 6(1)



CHIEF EXECUTIVE
Department of Primary Industries and Regions

26/4/2022

CONTACT	Ross Meffin
POSITION	A/g Executive Director
DIVISION	Biosecurity
MOBILE	0484 587 217
PREPARED BY	Annelise Wiebkin

eA197074

Government of South Australia

The Hon Clare Scriven MLC

Clause 6(1)

Email: Clause 6(1)

Dear Clause 6(1)

Thank you for your email of 13 April 2022 regarding public safety during aerial culling of feral deer.

Feral deer are a declared pest under the *Landscape South Australia Act 2019*. Land managers are required to remove feral deer from their properties in order to protect primary production industries, natural environments, and road users.

Feral deer numbers in South Australia, and in many parts of Australia, are too high to be controlled by ground shooting alone. In South Australia, aerial control is an important and effective way to reduce the impacts of feral deer.

In South Australia there are procedures in place to ensure the safety of public and livestock in the lead up to, and during, aerial shooting operations. They include, but are not limited to, only shooting on properties where approval for aerial shooting has been given by the land manager, licencing and accreditation from the Civil Aviation Safety Authority for low flying operations over approved properties, and stringent flight planning and risk assessments.

Strict plans and procedures are also in place to ensure feral deer are humanely culled. No animals are left injured, with a requirement for a minimum of two shots (sometimes more) per feral deer, and a deliberate fly-back procedure to confirm death.

If you would like to discuss this matter in more detail, please contact Dr Brad Page, A/General Manager, Invasive Species at the Department of Primary Industries and Regions, on 08 8429 0803.

Once again, thank you for writing to me to convey your concerns.

Yours sincerely

Hon Clare Scriven MLC
MINISTER FOR PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT

/ / 2022

Minister for Primary Industries and Regional Development
GPO Box 1671 Adelaide SA 5001
Telephone 08 8226 2931 | Email minister.scriven@sa.gov.au

SOUTH AUSTRALIA

Government of South Australia
Department of Primary Industries and Regions

MINISTER'S OFFICE
26 APR 2022
RECEIVED

Minute to
Minister for Primary Industries and Regional Development
Minister for Forest Industries

Ref: eA197074

For	**Approval and Signing**
Critical Date	**ASAP**
Subject	**Concerns over aerial shooting of feral deer**

Synopsis

A member of the public wrote to you apparently using a pseudonym, calling for a stop to aerial control of feral deer in SA. Recreational deer hunters commonly provide this feedback, believing that they should be used to cull deer. This briefing is to provide you with an overview of feral deer management in SA with respect to issues raised in the email, and a draft response letter.

Recommendations

That you:

1. Note the responses to concerns raised by Clause 6(1) regarding aerial culling of feral deer.

   NOTED

2. Sign the response letter to Clause 6(1) (Attachment A).

   SIGNED / NOT SIGNED

3. Consider attending a community meeting on the management of feral deer on the Limestone Coast, in Kingston on Wednesday 27 April at 5:30 pm.

   APPROVED / NOT APPROVED

C.M. Scriven

Hon Clare Scriven MLC

Minister for Primary Industries and Regional Development

Minister for Forests Industries

10 / 5 / 2022

Ministerial Comments

Background

Management of feral deer in SA

- Feral deer are a declared pest under the *Landscape South Australia Act 2019*, and land managers are required to remove them from their land. This is to protect our primary production industries, natural environment and road users from the impacts of feral deer. These include negative impacts of grazing on agriculture and native plants, as well as safety hazards.
- South Australia has an integrated approach to feral pest control, with feral deer culling methods focused on a combination of aerial and ground based shooting.
- Feral deer numbers are rapidly increasing across agricultural parts of SA, with a current estimated population of 40,000.
- SA's feral deer population is small compared with other parts of Australia, but population projections indicate feral deer will number more than 200,000 in 10 years, even with current control programs.
- A recent independent cost-benefit analysis of feral deer control found that under current control programs, production losses are expected to increase from an estimated $36 million in 2020/21 to $242 million by 2031.
- Intensified control programs are required to achieve substantial knockdowns of feral deer numbers, to both prevent the population growth seen in the eastern states of Australia and to get numbers of feral deer back to levels farmer can manage.
- The eradication of feral deer is a strategic priority for PIRSA and regional landscape boards; particularly in the Limestone Coast and Hills and Fleurieu regions, where impacts are highest. The recently revised State Feral Deer Policy supports this priority by requiring landholders to destroy all feral deer on their properties.
- Recreational deer hunters can continue to pursue their hobby, but they will need to invest in raising, managing and containing their deer, rather than capitalising on feral deer, which feed on the valuable pasture and crops of neighbouring farmers.
- You recently received a briefing recommending execution of a Funding Agreement to secure $4 million in Commonwealth funding for '*Enhancing national pest animal and weed management*' over four years (A5365693). This funding already forms part of approved budgets across forward estimates and will enable the eradication program to make significant inroads into numbers of feral deer.

Discussion

Correspondence

- On 13 April 2022, you received an email from Clause 6(1) , calling for a stop to aerial control of feral deer in South Australia, and alleging that the Department of Primary Industries and Regions (PIRSA) aerial control programs have involved firearm offences. The email was also sent to other politicians, media, shooting organisations, government and non-government organisations.
- The Advertiser sought a response to the email from PIRSA. PIRSA coordinated the response with input from the Limestone Coast and Hills and Fleurieu Landscape Boards, and the Department of Environment and Water. These agencies have conducted aerial control programs of feral deer for several years.

- Clause 6(1) claimed to represent the views of Sporting Shooters Association of Australia (SSAA) members, complaining that aerial controls are operating during "peak hunting period", and that they pose a safety risk to hunters and the public.
- PIRSA staff tried to contact Clause 6(1) to discuss the allegations to no avail. Neither the Sporting Shooters Association of Australia nor the Australian Deer Association have any record of this person, and so it is likely a disgruntled recreational deer hunter, advocating to stop very effective aerial control programs in South Australia.
- Clause 6(1) email is consistent with previous correspondence from recreational deer hunters across Australia, who seek to protect their hobby.
- The motivations of recreational hunters are for sport and enjoyment, to select the best trophy (antlers of male deer), or source enough meat their consumption (typically 1-2 deer).
- Hunting for these recreational purposes is not sufficient to provide control of feral deer. Effective pest control would require orders of magnitude more deer being culled by recreational hunters and would require that they target female rather than male deer and that they not stop hunting once they have harvested enough meat.
- Effective pest control works to remove a proportion of feral deer (requiring the removal of at least 35 per cent per year to counter their natural rate of reproduction), focusing on females to reduce population growth and impacts. Recreational shooting does not achieve pest control.
- On 14 April, the Advertiser printed a story highlighting that the SSAA refuted the claims of Clause 6(1), stating that his email does not reflect the views of the SSAA. SSAA were quoted supporting aerial control programs for feral deer and work collaboratively with state government operations.
- The claims made by Clause 6(1) in his email are baseless. The claims are made with the express intent of putting pressure on government to cease aerial culling programs.
- A response letter to Clause 6(1) (Attachment A) has been drafted for your consideration.

<u>Aerial culling – safety and procedures</u>

- In his email Clause 6(1) made significant claims regarding the safety and humaneness of aerial culling. Strict standards are applied to aerial cull operations carried out by PIRSA, Landscape Boards and the Department for Environment and Water, to ensure public safety, livestock safety and humaneness.
- Prior to any aerial control of pest animals, government staff obtain approval from land managers where the culling will occur. By doing so, farmers are able to ensure all people and livestock are safe. Aerial shooting only occurs on properties where landholders have given prior approval.
- Aerial shooting teams comprise of expert, trained, accredited and professional pilots and marksmen.
- Low flying is permitted under Civil Aviation Safety Authority regulations, with all team members possessing the required licences, accreditation, landholder permissions and following requisite flight procedures and risk assessments.
- If during an aerial cull the helicopter needs to transit across properties which are not involved in the program, it first ascends to higher elevations.

- Strict plans and procedures are in place to ensure feral deer are humanely culled. No animals are left injured, with a requirement for a minimum of two shots per feral deer, and a deliberate fly-back procedure to confirm death.

Limestone Coast community meeting on the management of feral deer

- The Limestone Coast Landscape Board will host a community meeting in Kingston, on Wednesday 27 April from 5:30 pm to 6:30 pm, at which many landholders affected by feral deer will attend. These landholders have been proactively working with staff from PIRSA and the Landscape Board to control feral deer.
- The meeting will cover issues related to coordinated control of feral deer in the region, as well as implementation of the new South East Pest Management Strategy. Landholders will be seeking to maximise opportunities and efficiencies in work with the landscape board and PIRSA to achieve value for money from management programs.
- Attending this meeting would provide you an opportunity to join Landscape SA and PIRSA staff to hear community views on feral deer issues. There will also be the chance to discuss government priorities and opportunities related to pest control in the Limestone Coast region.
- Should you wish to attend the meeting, PIRSA staff will be available on either 26 April, and/or immediately before the meeting to brief you on pest management relevant to the Limestone Coast.

Farmer and Stakeholder impacts/ Regional Business and Stakeholder impacts

- Feral deer impact on a range of primary production types including cattle, sheep, cropping, viticulture, and forestry.
- Eradication, including aerial control, of feral deer from SA has strong support from industry, landscape boards (Limestone Coast, Hills and Fleurieu, Northern and Yorke and Eyre Peninsula), state and Commonwealth governments, and the National Feral Deer Coordinator.

Management of key risks

- Feral deer impact a range of production industries and so the benefit of investment in eradication, including aerial control operations, is expected to be significant. A recent independent cost-benefit analysis showed that a proposed 10-year eradication program, budgeted at $14 million, will generate a net benefit to the community of $518 million over an 11-year period.
- Aerial control is the primary tool to achieve eradication, alongside new and innovative control tools (highlighted in previous briefing A5398868). Ground control alone cannot be sufficient.
- Recreational deer hunters will continue to advocate for the government cease aerial culling programs. The benefits of a deer eradication program, and the positive feedback from farmers, far outweigh negative attention from recreational hunters. The support from SMAA and positive spin of the Advertiser article already reflect this.

Consultation and engagement

- The Limestone Coast Landscape Board, Hills and Fleurieu Landscape Board and the Department for Environment and Water contributed to the response to the Advertiser addressing Clause 6(1) concerns.

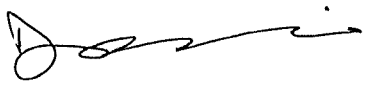
- The Department for Environment and Water and the Limestone Coast Landscape Board General Manager reviewed a draft version of this brief.

Financial implications

- None

Attachments

A. Response letter to Clause 6(1)



CHIEF EXECUTIVE
Department of Primary Industries and Regions

26/4/2022

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